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10/806,087

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Rajan Rajendran

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EXAMINER

RODRIGUEZ, WILLIAM H

ART UNIT

PAPER NUMBER

3741

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10/08/2008

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/806,087	<b>Applicant(s)</b> RAJENDRAN ET AL.	
	<b>Examiner</b> William H. Rodriguez	<b>Art Unit</b> 3746	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 01 August 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-7,9-29,71,75-95,97,99-102,104-106 and 108-120 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 75-95,97,99-102,104-106 and 108-120 is/are allowed.
- 6) ☒ Claim(s) 1 is/are rejected.
- 7) ☒ Claim(s) 2-7,9-29 and 71 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                       | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>5/13/08; 7/10/08</u>  | 6) <input type="checkbox"/> Other: _____                          |

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**DETAILED ACTION**

This office action is in response to the amendment and remarks filed 08/01/2008. The indicated allowability of claim 1 is withdrawn in view of the reference(s) to JP 11-141483. Rejections based on this reference follow.

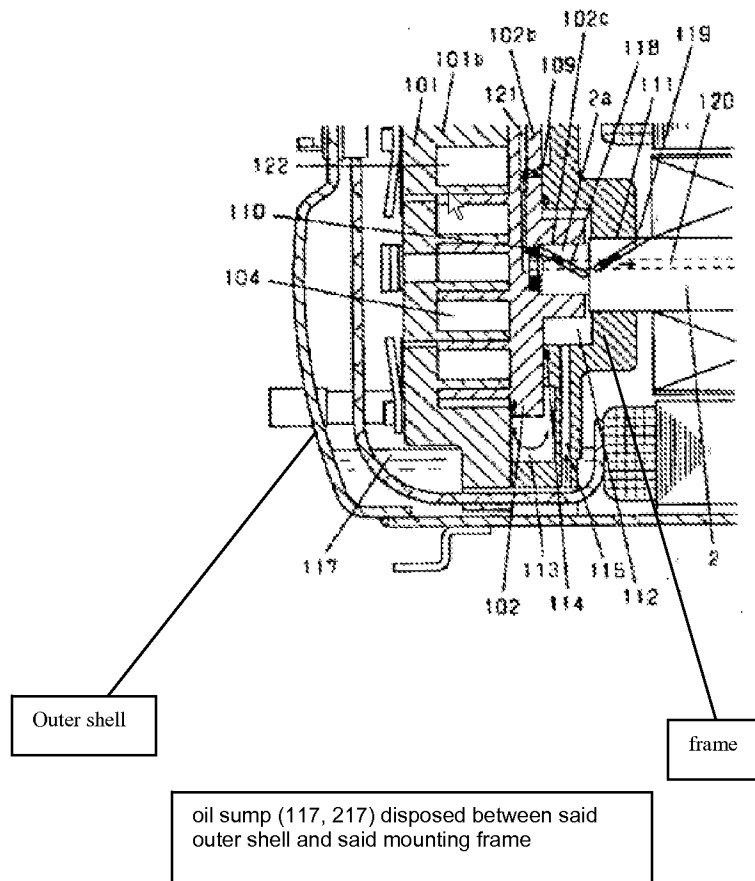
***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claim 1 is rejected under 35 U.S.C. 102(b) as being anticipated by JP 11-141483.



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3. JP 11-141483 teaches (particularly figures 1, 2 5 and 6) an outer shell defining a suction pressure zone; a first scroll compressor (101, 102) disposed within said suction pressure zone of said shell; a second scroll compressor (201, 202) disposed within said suction pressure zone of said shell; a drive shaft 2 extending between and coupled to each of said first and second scroll compressors said drive shaft operable to drive said first and second scroll compressors for compressing fluid disposed within said suction pressure zone; a mounting frame 103 disposed within said suction pressure zone of said shell, said first and second scroll compressors being attached to said mounting frame; a motor 3 disposed within said suction pressure zone of said shell between said first and second scroll compressors, said motor being attached to said mounting frame and drivingly coupled to said drive shaft; and an oil sump (117, 217) disposed between said outer shell and said mounting frame, said oil sump being in communication with said first scroll compressor through a first bore (120, 118) in said drive shaft and said second scroll compressor through a second bore 120 in said drive shaft. See paragraphs 0117 and 0118 of machine translation of JP 11-141483 attached/enclosed at the end of office action.

***Allowable Subject Matter***

4. Claims 2-7, 9-29 and 71 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

5. Claims 75-95, 97, 99-102, 104-106 and 108-120 are allowed.

***Contact information***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to William H. Rodríguez whose telephone number is 571-272-4831. The examiner can normally be reached on Monday-Friday 7:30 am to 5:00 pm.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Devon Kramer can be reached on 571-272-7118. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/William H. Rodríguez/  
Primary Examiner, Art Unit 3746

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Machine Translation of application [JP,11-141483,A(1999)]

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FULL CONTENTS CLAIM + DETAILED DESCRIPTION TECHNICAL FIELD PRIOR ART  
EFFECT OF THE INVENTION TECHNICAL PROBLEM MEANS EXAMPLE  
DESCRIPTION OF DRAWINGS DRAWINGS

**Disclaimer:**

This English translation is produced by machine translation and may contain errors. The JPO, the INPIT, and those who drafted this document in the original language are not responsible for the result of the translation.

**Notes:**

1. Untranslatable words are replaced with asterisks (\*\*\*).
2. Texts in the figures are not translated and shown as it is.

Translated: 05:00:57 JST 09/30/2008

Dictionary: Last updated 09/12/2008 / Priority:

**CLAIM + DETAILED DESCRIPTION**

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**[Claim(s)]**

[Claim 1] In the gas compressor which has arranged the 1st compression mechanism part and the 2nd compression mechanism part which operate with the driving shaft connected with said electric motor at the both sides of an electric motor single in an airtight container, and said electric motor The electric gas compressor equipped with the function to enable the pause of a compression operation of the compression mechanism part substantially by controlling in order to extend the direction crevice of a compression room axis between one compression mechanism parts.

[Claim 2] The electric gas compressor according to claim 1 which the 2nd [ said ] compression mechanism part which carries out series connection of the 1st compression mechanism part and the 2nd compression mechanism part, sets up the gas exclusion capacity of said 1st compression mechanism part and said 2nd compression mechanism part possible [ two step compression operation ], and becomes the high rank side at the time of two-step compression operation was made to equip with the function which can be compression operation stopped.

[Claim 3] Revolution scrolling which carries out sliding engagement and circles in the 2nd compression mechanism part in which a compression operation pause is possible to a driving shaft, The electric gas compressor according to claim 1 which made the scroll type compression mechanism part which consists of the fixed scroll element which gets into gear to said revolution scrolling, and forms a compression room, and was considered as controllable composition in order to equip said fixed scroll element with the function in which axial directional movement is possible and to extend the direction crevice of a compression room axis.

[Claim 4] A fixed scroll element consists only in the direction of an axis of the fixed scroll member which can move to said main part of a panel that the direction crevice of an axis between the main part of a panel fixed to the airtight container and the compression room geared and formed in revolution scrolling should be sealed and canceled. Said fixed scroll member is the electric gas compressor according to claim 3 which deserted said revolution scrolling according

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to the energization power of spring rigging, and was constituted by said revolution scrolling that approach movement should be carried out according to the high-pressure gas pressure power in said airtight container.

[Claim 5] The electric gas compressor according to claim 3 which the main part of a panel constituted so that it may divide the inside of an airtight container into the 1st compression mechanism part, the electric motor room which stores an electric motor, and the discharge room of the 2nd compression mechanism part.

[Claim 6] Between the sumps of the bottom of an electric motor room, and the bottom of the discharge room of the 2nd compression mechanism part The oil return passage which has the iris diaphragm passage which permits only an inflow in said electric motor room is arranged. Said oil return passage consists of the spring rigging which energizes the valve element which opens and closes said iris diaphragm passage, and said valve element toward the upper stream side of said iris diaphragm passage, and [ said spring rigging ] The electric gas compressor according to claim 5 which reduced energization power when the temperature of itself exceeded the preset value, brought said spring rigging close to the coil winding of an electric motor, and has arranged it while having the shape memory characteristic of maintaining the energization power, when the temperature of itself was under a preset value.

[Claim 7] The panel with which the fixed scroll member stopped on the main part of a panel, and hand-of-cut movement was prevented, The fixed scroll lap which is arranged on the whole surface of said panel, and gears with the revolution scroll lap of revolution scrolling, and forms a compression room, The electric gas compressor according to claim 4 which it consisted of the cylinder part of said panel arranged upwards on the other hand, and said cylinder part carried out fit-in ON into the main part of a panel, and has arranged spring rigging between said cylinder part and said main part of a panel, made spring energization power give said fixed scroll member, and made said cylinder part energize the high-pressure gas pressure power in an airtight container.

[Claim 8] Form a discharge gas passage inside a cylinder part that a discharge valve gear should be arranged, and a bypass valve is arranged to a compression room side rather than said discharge valve gear. While said bypass valve opens and closes the outlet side of the bypass hole arranged in the panel that between said compression room and discharge rooms should be opened for free passage and permitting the gas outflow of only a compression room to said discharge room The electric gas compressor according to claim 7 which carried out arrangement composition of said bypass valve and said discharge valve gear so that said discharge valve gear might contact said bypass valve and the outflow gas from a bypass hole might be blockaded temporarily, when said bypass valve opened.

[Claim 9] It is the electric gas compressor according to claim 8 which the bypass valve constituted the annular form of the thin board of having the connection way which turns into a bypass gas passage inside, and carried out arrangement composition so that the valve element of a discharge valve gear might constitute the annular form of a thin board of having the connection way which turns into a discharge gas passage outside and both the aforementioned connection ways might not overlap.

[Claim 10] The electric gas compressor according to claim 8 which gave spring energization power to the valve element of said discharge valve gear that a discharge valve gear should open according to the gas pressure power of the blockade space when the pressure of the space where

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the outflow gas from a bypass hole was blockaded temporarily exceeded a preset value.

[Claim 11] It is the electric gas compressor according to claim 8 equipped with the increase of energization power, and the shape memory characteristic which will reduce energization power if a temperature fall is carried out by energizing spring energization power by the spring rigging arranged at the discharge gas passage when the temperature of itself carried out the rise in heat of said spring rigging.

[Claim 12] The electric gas compressor according to claim 7 which formed the discharge gas passage inside the cylinder part that a discharge valve gear should be arranged, and \*\*\*\*\* of said discharge gas passage was made to approach at the \*\*\*\* form end mirror wall surface of an airtight container.

[Claim 13] Spring rigging is the electric gas compressor [ equipped with the shape memory characteristic in which energization power will carry out a sudden increase if the temperature of itself exceeds preset temperature ] according to claim 4.

[Claim 14] The electric gas compressor according to claim 7 which established the means which the panel back space formed between the panel of said fixed scroll member and said main part of a panel opens for free passage in an income room when a fixed scroll member deserts the main part of a panel.

[Claim 15] When a fixed scroll member carries out approach movement according to the high-pressure gas pressure power in an airtight container at revolution scrolling, [ that the direction contact of an axis with a fixed scroll member and revolution scrolling should be avoided ] The electric gas compressor according to claim 4 which served as the member of the moving range regulation means of said revolution scrolling that the moving range regulation means of said fixed scroll member should be established, and the member of said moving range regulation means should avoid the direction contact of an axis with said revolution scrolling and said fixed scroll member.

[Claim 16] The main part frame which has the thrust block which carries out the direction support of an axis of the revolution scrolling with the main guide bearing which supports a driving shaft, The electric gas compressor according to claim 15 which has arranged the member of a moving range regulation means between the main parts of a panel, and \*\*\*\*\*(ed) said revolution scrolling in the direction of an axis by said thrust block and the member of said moving range regulation means.

[Claim 17] [ a means by which the rotation stop of the fixed scroll member is carried out at the main part of a panel ] The electric gas compressor according to claim 5 which established the means which carries out differential pressure oil supply of the lubricating oil of the sump arranged in the bottom of a discharge room in said fit-in hole while making the guide pin fixed to the fit-in hole established in said fixed scroll member by said main part of a panel fit in and making said fit-in hole open for free passage to the inhalation side.

[Claim 18] The electric gas compressor according to claim 17 which made the perimeter part space which isolated from the sump in pressure and formed the lap support disk on which the revolution scroll lap of revolution scrolling was made based that it should \*\*\*\* by the main part frame and the member of a moving range regulation means open a fit-in hole for free passage.

[Claim 19] The means which carries out differential pressure oil supply from a sump in a fit-in hole is the electric gas compressor according to claim 17 which made said penetration insertion part the iris diaphragm passage of the differential pressure oil supply passage while making the



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main part of a panel carry out penetration insertion fixation of the guide pin.

[Claim 20] A level difference is prepared between the field where the panel of a scroll member contacts the member of a moving range regulation means, and the tip of a fixed scroll lap. The electric gas compressor according to claim 16 considered as the composition which can adjust the direction minimum clearance of an axis of a fixed scroll member and revolution scrolling by setting up so that said level difference may serve as board thickness Sayori smallness of the member of said moving range regulation means, and choosing the thickness of the member of said moving range regulation means according to said level difference.

[Claim 21] The electric gas compressor according to claim 15 which made the member of the moving range regulation means the quality of the material harder than it while making revolution scrolling and a fixed scroll member into this quality of the material.

[Claim 22] While supplying some lubricating oil which the driving shaft drove the capacity type pumping installation arranged in the 1st compression mechanism part, and sucked up from the sump to said 1st compression mechanism part In the composition which prepared the oil supply passage which supplies the remaining lubricating oil to the 2nd compression mechanism part through penetration \*\*\*\* prepared in the direction of an axis of said driving shaft The electric gas compressor according to claim 1 with which the lubricating oil supplied to said 2nd compression mechanism part equipped the oil passage which returns to said sump through a sliding part, and the oil passage which carries out a differential pressure inflow through the sliding part of said 2nd compression mechanism part at the inhalation side with said oil supply passage which carries out a part style.

[Claim 23] The electric gas compressor according to claim 1 considered as the axle hole composition by which each axis end part of after fit-in fixation and said driving shaft can insert a driving shaft in the 1st compression mechanism part and each main guide bearing of the 2nd compressor style from one way, and a cantilevered suspension assembly is carried out to the rotation child of an electric motor.

[Claim 24] The electric gas compressor according to claim 1 which made the same the direction of a swirl of the revolution scroll lap of revolution scrolling of both the compression mechanism part in the composition which made the 1st compression mechanism part and the 2nd compressor style the scroll type compressor style.

[Claim 25] The electric gas compressor according to claim 5 which was made to open the electric motor room, discharge room [ of the 2nd compression mechanism part ], and inhalation side of the 2nd compression mechanism part for free passage, and carried out this space made to open for free passage the discharge side of the 1st compression mechanism part when operating only the 1st compression mechanism part.

[Claim 26] The electric gas compressor according to claim 24 controlled in order to start said 2nd compression mechanism part at the time of operation starting of the 1st compression mechanism part and the 2nd compression mechanism part, after stopping the 2nd compression mechanism part and starting the 2nd compression mechanism part.

[Claim 27] The electric gas compressor according to claim 5 which controls the 2nd compression mechanism part after a plant shutdown in order to carry out series connection of the 1st compression mechanism part and the 2nd compression mechanism part when carrying out series connection of the 1st compression mechanism part and the 2nd compression mechanism part and changing the 1st compression mechanism part and the 2nd compression mechanism part to two-

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step compression operation after a parallel run.

[Claim 28] Carry out series connection of the 1st compression mechanism part and the 2nd compression mechanism part, and after two-step compression operation The electric gas compressor according to claim 5 which controls the 2nd compression mechanism part in order to carry out multiple connection of the 1st compression mechanism part and the 2nd compression mechanism part after a plant shutdown when changing to the parallel run of the 1st compression mechanism part and the 2nd compression mechanism part.

[Claim 29] The electric gas compressor according to claim 22 controlled that the short-time operation of the 2nd compression mechanism part should be carried out periodically when operating only the 1st compression mechanism part.

[Claim 30] The electric gas compressor according to claim 29 controlled that high speed driving should be carried out periodically.

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[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the operation control of a gas compressor and the oil supply passage which have arranged each compression mechanism part on both sides of an electric motor.

[0002]

[Description of the Prior Art] multilocular -- business -- the compression function in which it can respond to air-conditioning capacity change and an air-conditioning temperature change is required of an air-conditioning compressor.

[0003] It is [ that these technical problems should be coped with ] well-known to independence and the means corresponding to [ carry out a parallel run, carry out series connection of two or more compressors / \*\*\*\* / making it correspond to air-conditioning capacity change /, carry out multi-stage compression operation, carry out high compression ratio operation, and ] an air-conditioning temperature change, controlling the revolving speed of two or more compressors.

[0004] For example, the distribution diagram which carries out series connection of the discharge side of the low stage side compressor 1013 to the high rank side compressor 1014 inhalation-side, and carries out two-step compression operation of the vertical form electric scroll refrigerant compressor shown in drawing 8 as shown in drawing 9 is indicated by JP,H3-105092,A.

[0005] Thus, [ carry out series connection of the independent compressor, in carrying out two step compression operation, while lubricating oil of the low stage side compressor moves to the high rank side compressor with discharge refrigerant gas, lubricating oil of the high rank side compressor also moves to the low stage side compressor with discharge refrigerant gas, but ] Since lubricating oil movement magnitude is different with the operational status of each compressor, excess and deficiency arise in the amount of lubricating oil in each compressor.

[0006] As a result, a remarkable efficiency fall and part damage arise in a compressor with insufficient lubricating oil. As this preventive measure, with a compressor, the sump container 1010 of another object is arranged in the middle of both compressor connection piping, and the lubricating oil mixed in discharge refrigerant gas is prepared in the oil return means to the sliding

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part of each compressor after separation and storage.

[0007] The above-mentioned two-step compression system has the technical problem that a cost overrun is caused while requiring a compressor installation space.

[0008] As a policy of the above-mentioned business solution, it is well-known to two means expressed below. That is, the 1st solution means prepares two electric motors and two rolling piston type rotary compressor styles in one airtight container 2041, as shown in drawing 10, and the composition of the horizontal form compressor in which two-step compression is possible is indicated (JP,H4-112990,A).

[0009] Namely, the electric motor 2042 for low stages, the compressor style 2043 for low stages and the electric motor 2044 for high ranks, and the compressor style 2045 for high ranks are formed in the inside of the airtight container 2041. The electric motor 2042 for low stages which consists of a stator 2046 and the rotation child 2047 is connected with the driving shaft 2048 of the compressor style 2043 for low stages.

[0010] Moreover, the compressor style 2043 for low stages consists of spring rigging (with no illustration) for energizing main guide bearing 2049, the subaxle hole 2050, a cylinder 2051, the piston 2052 that carried out fitting to the crank part of the driving shaft 2048, Behn 2053, and Behn 2053 toward a piston 2052.

[0011] Moreover, the compressor style 2045 for high ranks consists of main guide bearing 2057, the subaxle hole 2058, a cylinder 2059, a piston 2060, Behn 2061, and spring rigging (with no illustration).

[0012] Furthermore, the isolation board 2062 of the shape of a disk fixed to the airtight container 2041 is formed between the 2nd discharge space B which prepared the electric motor 2042 for low stages, the compressor style 2043 for low stages, and the 1st discharge space A which has arranged the electric motor 2044 for high ranks and the compressor style 2045 for high ranks. It is the composition divided into the 1st discharge space A and 2nd discharge space B side.

[0013] In such a rolling piston type rotary compressor, two-step compression operation is performed as follows.

[0014] That is, the refrigerant gas inhaled from the low stage inhalation pipe 2064 is compressed at compressor guard 2043 for low stages, and is discharged by the 1st discharge space A.

[0015] While cooling the electric motor 2042 for low stages, and the electric motor 2044 for high ranks, pressure refrigerant gas is again compressed at compressor guard 2045 for high ranks through the low stage discharge pipe 2065 and the high rank inhalation pipe 2066, and is sent out to the frozen cycle piping system of the compressor exterior via [ the 2nd discharge space B and high rank discharge pipe 2067 ] one by one.

[0016] In addition, the revolving speed of the electric motor 2044 for high ranks is set up so that inhalation refrigerant capacity may become equal per unit time from the compressor style 2043 for low stages per unit time to discharge refrigerant capacity and the compressor style 2045 for high ranks.

[0017] On the other hand that the compressor style 2043 for low stages and the compressor style 2045 for high ranks are independent, or when parallel operation is carried out The low stage inhalation pipe 2064 and the high rank inhalation pipe 2066 are connected to the low-pressure piping system which is a frozen cycle, and the low stage discharge pipe 2065 and the high rank discharge pipe 2067 are connected to the high-pressure piping system which is a frozen cycle, respectively.

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[0018] Next, the 2nd solution means when air-conditioning capacity is smaller than the case of the 1st solution means is shown in drawing 11 and drawing 12 . [ drawing 11 and drawing 12 ] The compressor style 3004 for low stages of a rolling piston type rotary type and the compressor style 3005 for high ranks are arranged in an electric motor 3003 and the lower part at the upper part inside one airtight container 3002, respectively. The outline composition of the vertical rolling piston type rotary compressor 3001 in which two-step compression is possible, and a frozen cycle piping connection system are shown (JP,H2-11886,A).

[0019] And a refrigerant flows as follows and two-step compression operation is performed. Namely, the method valve 3034 of electromagnetism 2 in the state of a closed way [ the low-pressure refrigerant gas from an evaporator 3028 ] It is compressed into inside pressure at compressor guard 3004 for low stages through the AKYU muleta 3014. It is again compressed into high pressure at compressor guard 3005 for high ranks through a muffler 3022, and is breathed out inside the airtight container 3002, and after separating the lubricating oil mixed in cooling and refrigerant gas of an electric motor 3003, it flows into the condensation machine 3024 of the compressor exterior, the pressure reducing device 3027, and an evaporator 3028 one by one.

[0020] Moreover, while carrying out empty operation of the compressor style 3004 for low stages, without making two steps compress into the rotary compressor 3001, when carrying out compression operation only at compressor guard 3005 for high ranks, it realizes by changing the method valve 3034 of electromagnetism 2 into a \*\*\*\* state.

[0021] Namely, [ a part of ] while bypassing a part of refrigerant gas which went via the AKYU muleta 3014, the compressor style 3004 for low stages, and the muffler 3022 to the lower stream side (low pressure) of an evaporator 3028 through the bypass way 3035 After the remaining refrigerant gas inside a muffler 3022 is usually compressed through the compressor style 3005 for high ranks, it is discharged by the compressor exterior.

[0022]

[Problem to be solved by the invention] When [ however, / which the compressor style 2043 for low stages and the compressor style 2045 for high ranks are operated, and carries out parallel operation with the composition of the above-mentioned former ] carrying out a case and two-step compression operation Like \*\*\*\*, excess and deficiency arose in the amount of storage lubricating oil between the 1st discharge space A and the 2nd discharge space B, and the 1st technical problem that the remarkable decline in compression efficiency and the breakage of sliding parts resulting from the poor lubricous oil film seal of a compression room were caused occurred.

[0023] moreover, in carrying out high-speed sky operation of the compressor style 3004 for low stages with the composition of the above-mentioned latter, without making two steps compress into the rotary compressor 3001 When refrigerant gas passed the compressor style 3004 for low stages, it was compressed by passage resistance of the discharge valve gear 3008b on the low \*\* pressure level, and the 2nd technical problem that suitable compression loss arose occurred.

[0024] This invention does not solve such a conventional technical problem, and it aims at realizing the compressor style which compression loss does not produce and in which empty compression operation is possible.

[0025] The other purposes will become whether to be \*\* from the explanation mentioned later.

[0026]

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[Means for solving problem] In order to solve the above-mentioned technical problem, this invention carries out expansion control of the direction crevice of an axis between compression rooms.

[0027] By the direction crevice expansion control of an axis of the above-mentioned compression room, the upper stream [ in the compression interior of a room ] and lower stream side is made to open for free passage, and evasion of a pumping action is aimed at.

[0028]

[Mode for carrying out the invention] In the gas compressor which has arranged an electric motor with invention [ according to claim 1 ] single in an airtight container, and each compression mechanism part which operates with the driving shaft connected with an electric motor at the both sides of an electric motor By controlling in order to extend the direction crevice of a compression room axis between one compression mechanism parts, it has the function to enable the pause of a compression operation of the compression mechanism part substantially. And a gaseous pumping action can be avoided, without according to this composition, the upper stream [ in the compression interior of a room ] and lower stream side being open for free passage, and also producing circulation of the gas in the compression interior of a room.

[0029] Invention according to claim 2 carries out series connection of the 1st compression mechanism part and the 2nd compression mechanism part, sets up the gas exclusion capacity of the 1st compression mechanism part and the 2nd compression mechanism part possible [ two step compression operation ], and makes the 2nd compression mechanism part which becomes the high rank side at the time of two-step compression operation equipped with the function which can be compression operation stopped. And according to this composition, in carrying out the compression operation only of the 1st compression mechanism part, it becomes one-step compression operation and can perform the usual compression ratio operation. Series connection of the 1st compression mechanism part and the 2nd compression mechanism part is carried out, and in carrying out a compression operation, it becomes two-step compression operation and can perform high compression ratio operation. Two kinds of this mode of operation is chosen, and operation in the large range covering a low compression ratio - a quantity compression ratio can be performed.

[0030] Revolution scrolling which invention according to claim 3 carries out sliding engagement of the 2nd compression mechanism part in which a compression operation pause is possible at a driving shaft, and circles, It is considered as the scroll type compression mechanism part which consists of the fixed scroll element which gets into gear to revolution scrolling and forms a compression room, and it has controllable composition in order to equip a fixed scroll element with the function in which axial directional movement is possible and to extend the direction crevice of a compression room axis. And according to this composition, when fault compression arises at the compression room of the 2nd compression mechanism part, a fixed scroll element deserts revolution scrolling and the direction crevice of a compression room axis spreads. As a result, compression room pressure power declines and an electrical overload reduces. Moreover, in carrying out expansion control of the direction crevice of a compression room axis further, there is no pressure increase of a compression room and a compression function stops substantially.

[0031] Invention according to claim 4 [ a fixed scroll element ] It consists only in the direction of

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an axis of the fixed scroll member which can move to the main part of a panel that the direction crevice of an axis between the main part of a panel fixed to the airtight container and the compression room geared and formed in revolution scrolling should be sealed and canceled. A fixed scroll member deserts revolution scrolling according to the energization power of spring rigging, and is constituted by revolution scrolling according to the high-pressure gas pressure power in an airtight container that approach movement should be carried out. And according to this composition, when fault compression arises at the compression room of the 2nd compression mechanism part, according to compression room pressure power and the energization power of spring rigging, a fixed scroll element resists the energization power by the high-pressure gas pressure power in an airtight container, revolution scrolling is deserted, and the direction crevice of a compression room axis spreads. Then, when the pressure of a compression room declines, a fixed scroll member approaches revolution scrolling in response to the high-pressure gas pressure power in an airtight container, and the direction crevice of a compression room axis seals automatically. Moreover, when reducing the gas pressure power in the airtight container which energizes a fixed scroll member to the revolution scrolling side, according to the energization power of spring rigging, a fixed scroll member deserts revolution scrolling and the direction crevice of a compression room axis spreads greatly. And there is no pressure increase of a compression room and a compression function can be stopped automatically.

[0032] The main part of a panel constitutes invention according to claim 5 in order to divide the inside of an airtight container into the 1st compression mechanism part, the electric motor room which stores an electric motor, and the discharge room of the 2nd compression mechanism part. And according to this composition, without a fixed scroll member receiving the differential pressure of an electric motor room and the discharge room of the 2nd compression mechanism part directly, the main part of a panel wins popularity, modification of a fixed scroll member decreases, and seal of a compression room can be secured.

[0033] Invention according to claim 6 between the sumps of the bottom of an electric motor room, and the bottom of the discharge room of the 2nd compression mechanism part The oil return passage which has the iris diaphragm passage which permits only an inflow in an electric motor room is arranged. An oil return passage consists of the spring rigging which extracts the valve element and valve element which open and close an iris diaphragm passage, and is energized toward the upper stream side of a passage, and [ spring rigging ] If the temperature of itself exceeds a preset value, energization power will be reduced, and when the temperature of itself is under a preset value, while having the shape memory characteristic of maintaining the energization power, spring rigging is brought close to the coil winding of an electric motor, and is arranged. And when the pressure and temperature of a discharge room carry out an abnormal rise at the time of two-step compression operation according to this composition, while coil winding carries out an abnormal temperature rise and the energization power of spring rigging becomes small by the over-current to an electric motor By the differential pressure of the sump of a discharge room, and an electric motor room, it moves in the direction which a valve element opens, and an oil return passage is opened for traffic. And the discharge gas contained in lubricating oil and lubricating oil returns from the sump of the bottom of the discharge room of the 2nd compression mechanism part to an electric motor room, and the pressure of a discharge room returns normally.

[0034] Invention according to claim 7 [ a fixed scroll member ] The fixed scroll lap which is

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arranged on the whole surface of the panel with which it stopped on the main part of a panel, and hand-of-cut movement was prevented, and a panel, and gears with the revolution scroll lap of revolution scrolling, and forms a compression room, Consist of the cylinder part of a panel arranged upwards on the other hand, and a cylinder part carries out fit-in ON into the main part of a panel. Spring energization power is made to give a fixed scroll member in order to arrange spring rigging between a cylinder part and the main part of a panel and to make revolution scrolling desert in the direction of an axis, and a cylinder part is made to energize the high-pressure gas pressure power in an airtight container in order to bring a fixed scroll member close to revolution scrolling in the direction of an axis. And according to this composition, both the spring power of making a fixed scroll member deserting revolution scrolling in the direction of an axis, and the gas pressure power of bringing a fixed scroll member in the direction of an axis close at revolution scrolling are given. And the difference of the both power can perform seal and release of a compression room of the direction crevice of an axis.

[0035] Invention according to claim 8 forms a discharge gas passage inside a cylinder part that a discharge valve gear should be arranged. While arranging a bypass valve to a compression room side rather than a discharge valve gear, and a bypass valve's opening and closing the outlet side of the bypass hole arranged in the panel that between a compression room and discharge rooms should be opened for free passage and permitting the gas outflow of only a compression room to a discharge room When a bypass valve opens, a discharge valve gear contacts a bypass valve, and arrangement composition of a bypass valve and the discharge valve gear is carried out so that the outflow gas from a bypass hole may be blockaded temporarily. And according to this composition, a bypass valve opens at the time of slight fault compression operation, a part of gas of a compression room moves to another space, and compression room pressure power declines temporarily. And a compression operation continues. The gas temporarily confined in another space is discharged in a discharge room with the gas discharged from a discharge mouth, when valve opening of a discharge valve gear is brought forward and a discharge valve gear opens with the pressure.

[0036] In invention according to claim 9, a bypass valve constitutes the annular form of a thin board of having the connection way which turns into a bypass gas passage inside, and the valve element of a discharge valve gear constitutes the annular form of a thin board of having the connection way which turns into a discharge gas passage outside, and it carries out arrangement composition so that both the aforementioned connection ways may not overlap. And according to this composition, the gas temporarily bypassed from the compression room is simply sealed by the valve element and bypass valve of a discharge valve gear, and that gas pressure power is used for the promotion of valve opening of a discharge valve gear.

[0037] Invention according to claim 10 gives spring energization power to the valve element of said discharge valve gear that a discharge valve gear should open according to the gas pressure power of the blockade space, when the pressure of the space where the outflow gas from a bypass hole was blockaded temporarily exceeds a preset value. And according to this composition, it is prevented that a discharge valve gear opens superfluously and the gas of a discharge room flows backwards in a compression room through a discharge mouth according to the gas pressure power which flowed out of the bypass hole.

[0038] Invention according to claim 11 is energized by the spring rigging by which spring energization power has been arranged at the discharge gas passage, and if the temperature of

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itself carries out the rise in heat of said spring rigging, it will be equipped with the increase of energization power, and the shape memory characteristic which will reduce energization power if a temperature fall is carried out. And according to this composition, discharge gas pressure power and temperature rise, the time from valve opening of a discharge valve gear to valve closing is shortened, and a discharge gas reflux flow from a discharge mouth to a compression room decreases.

[0039] Invention according to claim 12 forms a discharge gas passage inside a cylinder part that a discharge valve gear should be arranged, and makes \*\*\*\*\* of a discharge gas passage approach the surface-of-a-sphere form end mirror wall surface of an airtight container. And according to this composition, the discharge gas which collided with the surface-of-a-sphere form end mirror wall surface distributes in all the directions, and the lubricating oil which stagnates in the bottom of a discharge room is spread into discharge gas, mixes in discharge gas, and flows into the compressor exterior.

[0040] Invention according to claim 13 will be equipped with the shape memory characteristic in which energization power carries out a sudden increase if, as for spring rigging, the temperature of itself exceeds preset temperature. And according to this composition, when the 2nd compression mechanism part is overheated, it becomes larger than the gas pressure power which the energization power and compression room pressure power of spring rigging energize to the fixed scroll member revolution scrolling-side, a fixed scroll member deserts revolution scrolling in the direction of an axis, and seal of a compression room is canceled.

[0041] Invention according to claim 14 establishes the means which the panel back space formed between the panel of a fixed scroll member and the main part of a panel opens for free passage in an income room, when a fixed scroll member deserts the main part of a panel. And according to this composition, when a fixed scroll member carries out estrangement movement in the direction of an axis from revolution scrolling, the gas of panel back space flows into an inhalatorium, and movement of a fixed scroll member becomes easy.

[0042] When a fixed scroll member carries out approach movement of the invention according to claim 15 according to the high-pressure gas pressure power in an airtight container at revolution scrolling, [ that the direction contact of an axis with a fixed scroll member and revolution scrolling should be avoided ] The moving range regulation means of a fixed scroll member is established, and the member of a moving range regulation means serves as the member of the moving range regulation means of revolution scrolling that the direction contact of an axis with revolution scrolling and a fixed scroll member should be avoided. And according to this composition, the direction contact of an axis of a fixed scroll member and revolution scrolling is avoided, revolution scrolling circles smoothly, and the friction loss of a fixed scroll member and revolution scrolling is maintained few.

[0043] Invention according to claim 16 arranges the member of a moving range regulation means between the main part frame which has the thrust block which carries out the direction support of an axis of the revolution scrolling with the main guide bearing which supports a driving shaft, and the main part of a panel, and pinches revolution scrolling in the direction of an axis by the thrust block and the member of a moving range regulation means. And according to this composition, after the fixed scroll member has deserted revolution scrolling, revolution scrolling is stabilized and a circular movement can be continued.

[0044] [ a means by which the rotation stop of the fixed scroll member is carried out at the main



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part of a panel as for invention according to claim 17 ] While making the guide pin fixed to the fit-in hole established in the fixed scroll member by the main part of a panel fit in and making a fit-in hole open for free passage to the inhalation side, the means which carries out differential pressure oil supply of the lubricating oil of the sump arranged in the bottom of a discharge room in a fit-in hole is established. And according to this composition, the axial directional movement of the fixed scroll member can be carried out smoothly.

[0045] Invention according to claim 18 makes the perimeter part space which isolated from the sump in pressure and was formed open a fit-in hole for free passage that the lap support disk on which the revolution scroll lap of revolution scrolling was made based should be pinched by the main part frame and the member of a moving range regulation means. And according to this composition, while being able to carry out the axial directional movement of the fixed scroll member smoothly, revolution scrolling can continue a smooth circular movement.

[0046] The means which carries out differential pressure oil supply of the invention according to claim 19 from a sump in a fit-in hole makes a penetration insertion part the iris diaphragm passage of a differential pressure oil supply passage while making the main part of a panel carry out penetration insertion fixation of the guide pin. And according to this composition, the simple differential pressure oil supply means for carrying out axial directional movement of the fixed scroll member smoothly is offered.

[0047] The field where the panel of a scroll member contacts the member of a moving range regulation means in invention according to claim 20, By preparing a level difference between the tips of a fixed scroll lap, setting up so that a level difference may serve as board thickness Sayori smallness of the member of a moving range regulation means, and choosing the thickness of the member of a moving range regulation means according to a level difference It has composition which can adjust the direction minimum clearance of an axis of a fixed scroll member and revolution scrolling. And according to this composition, the direction crevice of an axis between the compression rooms formed by the fixed scroll member which moves in the direction of an axis, and revolution scrolling is secured minutely.

[0048] While invention according to claim 21 makes revolution scrolling and a fixed scroll member this quality of the material, it makes the member of a moving range regulation means the quality of the material harder than it. And according to this composition, when a revolution scroll member and a fixed scroll member carry out a temperature change according to a compressor operating speed or load conditions, the Ryobe article carries out a dimensional change similarly, and change of a compression room crevice decreases. Moreover, the endurance of a slide contact side with the member of a moving range regulation means is secured.

[0049] [ invention ] while invention according to claim 22 supplies some lubricating oil which the driving shaft drove the capacity type pumping installation arranged in the 1st compression mechanism part, and sucked up from the sump to the 1st compression mechanism part In the composition which prepared the oil supply passage which supplies the remaining lubricating oil to the 2nd compression mechanism part through penetration \*\*\*\* prepared in the direction of an axis of a driving shaft The lubricating oil supplied to the 2nd compression mechanism part equips the oil passage which returns to a sump through a sliding part, and the oil passage which carries out a differential pressure inflow through the sliding part of the 2nd compression mechanism part at the inhalation side with the oil supply passage which carries out a part style. And according to this composition, the oil supply passage which can secure the endurance of the

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compression mechanism part at the time of empty compression operation is realizable.

[0050] Invention according to claim 23 has axle hole composition by which each axis end part of after fit-in fixation and a driving shaft can insert a driving shaft in the 1st compression mechanism part and each main guide bearing of the 2nd compressor style from one way, and a cantilevered suspension assembly is carried out to the rotation child of an electric motor. And according to this composition, the assembly of a driving shaft and each compression mechanism part becomes easy, and it becomes easy to unite the center of each compressor style and a driving shaft.

[0051] Invention according to claim 24 makes the same the direction of a swirl of the revolution scroll lap of revolution scrolling of both the compression mechanism part in the composition which made the 1st compression mechanism part and the 2nd compressor style the scroll type compressor style. And according to this composition, since it is mutually connected with the driving shaft when each revolution scrolling tends to reverse-rotate in each direction by the differential pressure of an electric motor room, a discharge room, and a compression room until the discharge valve gear immediately after a compressor stop closes a discharge mouth, reverse rotation of a drive system is prevented.

[0052] When operating only the 1st compression mechanism part, invention according to claim 25 makes the electric motor room, discharge room [ of the 2nd compression mechanism part ], and inhalation side of the 2nd compression mechanism part open for free passage, and carries out this space made to open for free passage the discharge side of the 1st compression mechanism part. And according to this composition, after the 2nd discharge room and compression room of a compression mechanism part have carried out \*\* pressure, according to the energization power of spring rigging, a fixed scroll member deserts revolution scrolling in the direction of an axis, seal of a compression room is canceled, and it will be in a compression plant shutdown state.

[0053] At the time of operation starting of the 1st compression mechanism part and the 2nd compression mechanism part, invention according to claim 26 stops the 2nd compression mechanism part, and it is controlled in order to start the 2nd compression mechanism part, after starting the 2nd compression mechanism part. And according to this composition, compressor starting load reduces and electric motor striking current decreases.

[0054] Invention according to claim 27 the 1st compression mechanism part and the 2nd compression mechanism part after a parallel run When carrying out series connection of the 1st compression mechanism part and the 2nd compression mechanism part and changing to two-step compression operation, the 2nd compression mechanism part is controlled after a plant shutdown in order to carry out series connection of the 1st compression mechanism part and the 2nd compression mechanism part. And according to this composition, the rapid load change which acts on the electric motor at the time of two-step compression operation starting is avoided.

[0055] Carry out series connection of the invention according to claim 28, and the 1st compression mechanism part and the 2nd compression mechanism part after two-step compression operation When changing to the parallel run of the 1st compression mechanism part and the 2nd compression mechanism part, the 2nd compression mechanism part is controlled after a plant shutdown in order to carry out multiple connection of the 1st compression mechanism part and the 2nd compression mechanism part. And according to this composition, the rapid load change which acts on the electric motor at the time of parallel compression operation starting is avoided.

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[0056] Invention according to claim 29 is controlled that the short-time operation of the 2nd compression mechanism part should be carried out periodically, when operating only the 1st compression mechanism part. And according to this composition, it is avoided that lubricating oil and the condensation liquid of compression gas stagnate in the compression room of the 2nd compression mechanism part. And the starting load at the time of starting the 2nd compression mechanism part reduces.

[0057] Invention according to claim 30 is controlled that high speed driving should be carried out periodically. And according to this composition, it is prevented that lubricating oil stagnates in the discharge room of the 2nd compression mechanism part superfluously.

[0058]

[Working example] The work example of this invention is hereafter explained with reference to Drawings.

[0059] Drawing 1 shows the vertical section at the time of a stop of the compressor in which multi-operation of the horizontal form scroll type which arranges and connected the electric motor 3 between the 1st scroll type compressor style 100 in the iron airtight containers 1 and the 2nd scroll type compressor style 200 is possible, and drawing 2 shows the vertical section at the time of operation of this compressor.

[0060] [ the 1st scroll type compressor style 100 ] [ the end of the driving shaft 2 connected with the rotation child 3a of an electric motor 3 ] That it should support [ the 1st main guide bearing 111 ] The fixed scrolling 101 made of cast iron concluded on the 1st main part frame 103 made of cast iron by which has and welding fixation was carried out at the airtight container 1, and the 1st main part frame 103, the revolution scrolling 102 made from an aluminium alloy which gears to the fixed scrolling 101 and forms the compression room 104, It consists of the rotation prevention mechanism (with no illustration) of the revolution scrolling 102.

[0061] The fixed scrolling 101 consists of the fixed lap 101a and Panel 101b. The discharge valve gear 106 which opens and closes the discharge mouth 105 which begins to roll and carries out an opening to a part and the discharge mouth 105 of the fixed lap 101a, and the bypass valve equipment 108 which open and close the bypass hole 107 which carries out an opening to the compression room 104 in the middle of compression are arranged by Panel 101b.

[0062] The revolution scrolling 102 consists of the revolution lap 102a and the lap support disk 102b.

[0063] The lap support disk 102b is arranged in the minute crevice between the thrust block 109 prepared in the 1st main part frame 103, and the panel 101b of the fixed scrolling 101.

[0064] The sliding checking and verifying of the crankshaft 2a prepared in the end of the driving shaft 2 are carried out to the 1st revolution axle hole 102c prepared in the revolution scrolling 102, and it is constituted that the TOROKOIDO type pumping installation 110 arranged at the end should be driven.

[0065] The annular seal ring 114 which divides the slide contact side of the thrust block 109 of the 1st main part frame 103 to the inside back pressure room 112 and the outside perimeter part space 113 is arranged in the state of \*\*\*\* in the grooving slot established in the slide contact side of the thrust block 109.

[0066] The back pressure room 112 leads to the 1st sump 117 arranged at the bottom of the electric motor room 116 which stores an electric motor 3 through the oil suction hole 115 established in the main part frame 103.

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[0067] Lubricating oil of the 1st sump 117 is sucked up by operation of the TOROKOIDO type pumping installation 110. Penetration \*\*\*\* 120 which carried out eccentricity to 1st spiral \*\*\*\* 118 and 2nd spiral \*\*\*\* 119 from the principal axis at the axle hole sliding surfaces of the driving shaft 2, and was prepared in the axis is formed in the 1st scroll type compressor style 100 and the 2nd scroll type compressor style 200 that lubricating oil supply should be carried out. The 2nd spiral \*\*\*\* 119 and penetration \*\*\*\* 120 are open for free passage.

[0068] The TOROKOIDO type pumping installation 110 arranged in the lap support disk 102b of the revolution scrolling 102 has the oil suction passage which the inventor presented by Japanese Patent Application No. 1-283561, for example.

[0069] While the discharge side of the TOROKOIDO type pumping installation 110 leads to the perimeter part space 113 through the radial oil passage 121 which is prepared in the lap support disk 102b, and has a converging section, it leads also to the sliding part of the 2nd scroll type compressor style 200 through penetration \*\*\*\* 120 of a driving shaft 2.

[0070] \*\*\*\* in the middle of the radial oil passage 121 is arranged that an opening should be intermittently carried out to annular \*\*\*\* (with no illustration) prepared also in the thrust block 109.

[0071] The perimeter part space 113 leads to the inhalatorium 122 through \*\*\*\* (with no illustration) arranged in the sliding surfaces of the panel 101b of the fixed lap 101a.

[0072] The 1st inhalation pipe 123 which carries out an opening to an inhalatorium 122 has penetrated the horizontal wall of the airtight container 1.

[0073] The discharge room 124 of the 1st scroll type compressor style 100 was established in the 1st main part frame 103, is cut, is lacked, and leads to the electric motor room 116 and the 1st sump 117 through 125a and 125b.

[0074] The power supply contact button 126 arranged by the horizontal wall of the airtight container 1 is connected to the electric motor 3 through the path cord which cuts and lacks and passes 125b.

[0075] The opening of the 1st discharge pipe 127 arranged by the airtight container 1 is carried out into the electric motor room 116 near the 2nd scroll type compressor style 200.

[0076] Next, the 2nd scroll type compressor style 200 is explained. [ the 2nd scroll type compressor style 200 ] Between the 2nd main part frame 203 made of cast iron, and the fixed scroll element 201 and the 2nd main part frame 203 which has the 2nd main guide bearing 211 in the airtight container 1 that the other end of the fixed scroll element 201 by which welding fixation was carried out, and a driving shaft 2 should be supported It consists of the rotation prevention mechanism (with no illustration) of the middle-sized board 228 made of sintered iron by which bolt conclusion was arranged and carried out, the revolution scrolling 202 made from an aluminium alloy which gears to the fixed scroll element 201 and forms the compression room 204, and the revolution scrolling 202.

[0077] [ the element ] so that the fixed scroll element 201 may divide the inside of the airtight container 1 into the 2nd discharge room 224 and electric motor room 116 of the scroll type compressor style 200 The letter part of a perimeter projection is guided at the guide pin 229 fixed to the airtight container 1 by the main part 201b of a panel made of soft iron by which all the circumference seal welding was carried out, and the main part 201b of a panel, and consists only in the direction of an axis of the fixed scroll member 230 made from an aluminium alloy which can move.

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[0078] The fixed scroll member 230 consists of the cylinder part 230c which has the fixed lap 230a, Panel 230b, and a large opening end.

[0079] The level difference H also with board thickness Sayori of a middle-sized board 228 small 10-15 microns is formed between the fixed lap 230a and Panel 230b (refer to drawing 6 ).

[0080] The cylinder part 230c is \*\*\*\*(ed) in the central hole 201c of the main part 201b of a panel, and is divided the discharge room 224 side with the seal ring 231 arranged in the central hole 201c at the revolution scrolling 202 side.

[0081] It stops to the right end outside circumference of a cylinder part 230c, a ring 232 is fixed, and the coiled spring (spring rigging) 233 is arranged between the stop ring 232 and the main part 201b of a panel.

[0082] Energization power required to move the fixed scroll member 230 in the direction of the discharge room 224 is given, in drawing 1 , the back of Panel 230b contacts the main part 201b of a panel, and a coiled spring (spring rigging) 233 has the direction crevice of an axis between the compression rooms 204 in the maximum expansion state.

[0083] Moreover, on the contrary, like drawing 2 , the fixed scroll member 230 moves to the revolution scrolling 202 side, and after Panel 230b has contacted the middle-sized board 228, the direction crevice of an axis between the compression rooms 204 is in the minimum state.

[0084] In the state of this minimum, the tip of the fixed lap 230a does not contact the lap support disk 202b of the revolution scrolling 202, but the minute crevice between the grades which can carry out oil film formation (about 10-15 microns) exists.

[0085] In addition, in this state, 230d of panel back space between Panel 230b and the main part 201b of a panel is open for free passage to the inhalatorium 222 through the pressure relief hole 243 established in Panel 230b.

[0086] The discharge valve gear 206 which opens and closes the discharge mouth 205 which begins to roll and carries out an opening to a part and the discharge mouth 205 of the fixed lap 230a, and the annular bypass valve equipment 208 which open and close the bypass hole 207 which carries out an opening to the compression room 204 in the middle of compression are arranged inside the cylinder part 230c.

[0087] The discharge valve gear 206 consists of the coiled spring (spring rigging) 235 which was arranged inside the cylinder part 230c and which stopped and was stopped by the ring 234, and the valve element 236 (see the appearance form of drawing 3 ) made from steel sheets energized by this.

[0088] The coiled spring (spring rigging) 235 is equipped with the shape memory characteristic which reduces energization power, if the temperature of itself rises and the temperature of increase and itself will fall energization power.

[0089] Annular bypass valve equipment 208 is installed so that the discharge mouth 205 may be surrounded at the back of the valve element 236 (see the appearance form of drawing 4 ) made from steel sheets.

[0090] The revolution scrolling 202 consists of the revolution lap 202a, the lap support disk 202b, and fixed pivot 202c of the same direction of a swirl as the revolution lap 102a of the revolution scrolling 102 of the 1st compressor style 101.

[0091] The lap support disk 202b is arranged in the minute crevice in which oil film formation is possible between the thrust block 209 and middle-sized board 228 which were prepared in the 2nd main part frame 203.

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[0092] The principal-axis part 2b prepared in the other end of the driving shaft 2 is supported by the 2nd main guide bearing 211, and the fixed pivot 202c of the revolution scrolling 202 is carrying out checking and verifying to the revolution axle hole 237 arranged inside the principal-axis part 2b.

[0093] The eccentric position of the crankshaft 2a (1st scroll type compressor style 100) of a driving shaft 2 and the eccentric position of the revolution axle hole 237 arranged inside the principal-axis part 2b are mutually arranged to the principal axis of a driving shaft 2 at the opposite side.

[0094] \*\* balance and \*\* balance balance mutually, a driving shaft 2 rotates smoothly, and the drive system of the 1st scroll type compressor style 100 and the drive system of the 2nd scroll type compressor style 200 are set up so that unnecessary axle hole load may not act on main guide bearing (111,211) etc.

[0095] The annular seal ring 214 which divides the slide contact side of the thrust block 209 of the 2nd main part frame 203 to the inside back pressure room 212 and the outside perimeter part space 213 is arranged in the state of \*\*\*\* in the grooving slot established in the slide contact side of the thrust block 209.

[0096] While the back pressure room 212 leads to penetration \*\*\*\* 120 of a driving shaft 2 through the sliding surfaces of the revolution axle hole 237, it leads to the 1st sump 117 through the sliding surfaces of the 2nd main guide bearing 211.

[0097] Moreover, the back pressure room 212 leads to the 2nd perimeter part space 213 through the radial oil passage 221 which has the converging section formed in the lap support disk 202b of the revolution scrolling 202. \*\*\*\* in the middle of the radial oil passage 221 is arranged that an opening should be intermittently carried out to annular \*\*\*\* (with no illustration) prepared also in the thrust block 209.

[0098] The 2nd perimeter part space 213 leads to the inhalatorium 222 through \*\*\*\* 238 prepared in the sliding surfaces of the middle-sized board 228.

[0099] The 2nd inhalation pipe 223 which carries out an opening to an inhalatorium 222 has penetrated the horizontal wall of the airtight container 1.

[0100] The 2nd discharge pipe 227 arranged by the horizontal wall of the airtight container 1 is carrying out the opening to the discharge room 224.

[0101] [ the 2nd sump 217 and 1st sump 117 of a bottom of the discharge room 224 ] It is open for free passage through the oil return passage 242 which consists of the spring rigging 241 which energizes the valve element 240 of the corundum which was prepared in the main part 201b of a panel, and which extracts and blockades the end of a passage 239 and the iris diaphragm passage 239, and a valve element 240 to the 2nd sump 217 side.

[0102] The spring rigging 241 reduced energization power, when the temperature of itself exceeded the preset value, and if the temperature of itself becomes below a preset value, it is equipped with the shape memory characteristic that energization power returns.

[0103] The operation is explained about the refrigerant compressor equipped with the scroll type compressor style constituted as mentioned above.

[0104] (Work example 1) First, independent compression operation only of the 1st scroll type compressor style 100 is carried out, and the case (when small refrigerating capacity operation is needed) where a compression operation of the 2nd scroll type compressor style 200 is stopped is explained.

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[0105] In drawing 1 , the 1st inhalation pipe 123 is connected to the lower stream side (low-pressure side) of the evaporator in a frozen cycle, and the 2nd inhalation pipe 223, the 1st discharge pipe 127, and the 2nd discharge pipe 227 are connected to the upper stream side (high-pressure side) of the condensation machine which is a frozen cycle.

[0106] Since the discharge room 224 of the 2nd scroll type compressor style 200 is equal to suction pressure, [ the fixed scroll member 230 of the fixed scroll element 201 ] It is moving until it deserts the revolution scrolling 202 about 5mm in the direction of an axis and contacts the main part 201b of a panel according to the energization power of a coiled spring (spring rigging) 233.

[0107] By being impressed by the power supply contact button 126 from an inverter power supply circuit (with no illustration), an electric motor 3 is magnetized, a driving shaft 2 rotates, and the revolution scrolling 102 drives.

[0108] The revolution scrolling 102 circles to the fixed scrolling 101 by operation of a rotation prevention mechanism (with no illustration), and an inhalation compression operation of the 1st scroll type compressor style 100 functions.

[0109] That is, the refrigerant gas having contained the lubricating oil which flowed into the inhalatorium 122 is discharged by the discharge room 124 through the compression room 104, the discharge mouth 105, and the discharge valve gear 106 from the 1st inhalation pipe 123.

[0110] In addition, the refrigerant gas in the middle of passage joins the lubricating oil which flowed through the course later mentioned from the 1st sump 117 in an inhalatorium 122.

[0111] The refrigerant gas discharged by the discharge room 124 cools an electric motor 3 after separating some lubricating oil, and is sent out to the compressor exterior by operation of the force of inertia of a collision, adhesion, and lubricating oil with the wall surface of the airtight container 1 etc. from the 1st discharge pipe 127.

[0112] In addition, adhesion on the large surface of the coil winding bunch of an electric motor 3 dissociates effectively, and the lubricating oil contained in the refrigerant gas in the middle of passage in the electric motor room 116 is collected by the 1st sump 117 by it.

[0113] Next, the flow of lubricating oil is explained. Lubricating oil of the 1st sump 117 is supplied to the 1st scroll type compressor style 100 and the 2nd scroll type compressor style 200 by the TOROKOIDO type pumping installation 110 arranged and driven at the end of a driving shaft 2.

[0114] That is, as shown in drawing 5 , lubricating oil of the 1st sump 117 is inhaled by the TOROKOIDO type pumping installation 110 through 1st spiral \*\*\*\* 118 prepared in the oil suction hole 115 of the 1st scroll type compressor style 100, the back pressure room 112, and the crankshaft 2a. Lubricous [ of the sliding surfaces of the 1st revolution axle hole 102c in the middle of the course ] is carried out.

[0115] Moreover, the lubricous oil pressure power of the back pressure room 112 carries out back pressure energization of the revolution scrolling 102 at the fixed scrolling 101 side, and reduces the thrust load which acts on the thrust block 109.

[0116] [ some lubricating oil discharged from the TOROKOIDO type pumping installation 110 ] After being decompressed through radial \*\*\*\* 121 which has the converging section formed in the lap support disk 102b of the revolution scrolling 102, While flowing into the perimeter part space 113, annular \*\*\*\* (with no illustration) prepared in the thrust block 109 is supplied intermittently, and it carries out lubricous [ of the sliding surfaces of the thrust block 109 ].

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[0117] Lubricating oil of the perimeter part space 113 flows into an inhalatorium 122 through \*\*\*\* (with no illustration) prepared in the sliding surfaces of the panel 101b of the fixed scrolling 101, and joins inhalation refrigerant gas, and oil film seal of the minute crevice between the compression rooms 104 is presented with it.

[0118] On the other hand, the remaining lubricating oil discharged from the TOROKOIDO type pumping installation 110 is supplied to the 2nd scroll type compressor style 200 through penetration \*\*\*\* 120 of a driving shaft 2.

[0119] After some lubricating oil in the middle of passage shunting penetration \*\*\*\* 120 toward 2nd spiral \*\*\*\* 119 of a driving shaft 2 and carrying out lubricous [ of the sliding surfaces of the 1st main guide bearing 111 ], it returns to the 1st sump 117.

[0120] As shown in drawing 6, the lubricating oil supplied to the 2nd scroll type compressor style 200 through penetration \*\*\*\* 120 of a driving shaft 2 returns to the 1st sump 117 through the sliding surfaces of the sliding surfaces of the revolution axle hole 237 and a fixed pivot 202c, the back pressure room 212, and main guide bearing 211.

[0121] In addition, lubricating oil in the middle of passage makes the revolution scrolling 202 energize the back pressure room 212 to the middle-sized board 228 side by the lubricous oil pressure power of pump pressure power of the TOROKOIDO type pumping installation 110.

[0122] However, the oil supply passage resistance from penetration \*\*\*\* 120 of a driving shaft 2 to the 1st sump 117 is set up small, and pressure is 2kg/cm<sup>2</sup> as \*\* of the TOROKOIDO type pumping installation 110. Below, there is little energization power to the revolution scrolling 202 to lubricating oil of the back pressure room 212. As a result, the circular movement where the state with very little friction loss of the lap support disk 202b of the revolution scrolling 202 and a middle-sized board 228 was held, and the revolution scrolling 202 was stabilized is continued.

[0123] Moreover, the back pressure room 212 [ some lubricating oil in the middle of passage ] After being decompressed through the radial oil passage 221 which has the converging section formed in the lap support disk 202b of the revolution scrolling 202, While very small supply is carried out in the perimeter part space 213, annular \*\*\*\* (with no illustration) prepared in the thrust block 209 is supplied intermittently, and it carries out lubricous [ of the sliding surfaces of the thrust block 209 ].

[0124] Moreover, very small supply of some lubricating oil in the middle of passage is carried out in the perimeter part space 213 through the sliding surfaces of the annular groove which stores the annular seal ring 214, or the annular seal ring 214 in the back pressure room 212, and it carries out lubricous [ of the thrust block 209 in the middle of the passage ].

[0125] The lubricating oil supplied to the perimeter part space 213 through both courses is supplied to an inhalatorium 222 through \*\*\*\* 238 prepared in the middle-sized board 228, and is sent out to the connection piping system of the 1st discharge pipe 127 through the 2nd inhalation pipe 223.

[0126] In addition, since the direction crevice of an axis between the compression rooms 204 is expanded to the maximum, the discharge valve 236 which inhalation / compression operation did not arise at 2nd scroll type compressor guard 200, and was energized by the coiled spring (spring rigging) 235 does not open and close the discharge mouth 205.

[0127] Moreover, since the lap support disk 202b of the revolution scrolling 202 is pinched in the minute crevice by which oil film formation was carried out between the thrust block 209 and the middle-sized board 228, it continues the circular movement with the smooth revolution



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scrolling 202.

[0128] (Work example 2) Next, the case (when big refrigerating capacity operation is needed) where the parallel run of the 1st scroll type compressor style 100 and the 2nd scroll type compressor style 200 is carried out is explained.

[0129] During operation in the state of a work example 1, the 2nd inhalation pipe 223 is changed to the lower stream side (low-pressure side) of the evaporator of a frozen cycle, and it connects.

[0130] That is, it changes to the state where the 1st inhalation pipe 123 and the 2nd inhalation pipe 223 were connected to the lower stream side (low-pressure side) of the evaporator which is a frozen cycle, and the 1st discharge pipe 127 and the 2nd discharge pipe 227 were connected to the upper stream side (high-pressure side) of the condensation machine which is a frozen cycle.

[0131] While the discharge valve 236 blockades the discharge mouth 205, an inhalatorium 222 and the compression room 204 become suction pressure. As a result, the fixed scroll member 230 to which discharge pressure acted on the cylinder part 230c moves forward until it resists the energization power of a coiled spring (spring rigging) 235 and contacts a middle-sized board 228, and it will be in the state of drawing 2. In this state, there is no direction contact of an axis with the revolution scrolling 202 and the fixed scroll member 230, and it will be in the state of having the direction crevice of a compression room axis which is about 15 microns. 230d of panel back space between the main part 201b of a panel and the fixed scroll member 230 becomes suction pressure through a pressure relief hole 243.

[0132] And the 2nd scroll type compressor style 200 starts normal inhalation / compression operation.

[0133] After unification with the lubricating oil by which decompression supply was carried out from the 1st sump 117 through the same course as \*\*\*\* in the inhalatorium 222, the refrigerant gas having contained the lubricating oil which flowed into the inhalatorium 222 through the 2nd inhalation pipe 223 is compressed, and is breathed out by the discharge room 224 through the discharge mouth 205 and the discharge valve gear 206. The refrigerant gas breathed out by the discharge room 224 is sent out to the piping system linked to the 1st discharge pipe 127 after separating lubricating oil.

[0134] Since lubricating oil of the 2nd sump 217 receives the influence by the flow of the discharge refrigerant gas discharged broadly from the discharge mouth 205, it does not stagnate superfluously.

[0135] In addition, since it is blockaded by the valve element 240 of the corundum with which it extracted and the end of the passage 239 received energization of the coiled spring 241 prepared in the main part 201b of a panel, lubricating oil does not move between the 1st sump 117 and the 2nd sump 217.

[0136] moreover, when liquid compression etc. occurs and the pressure of the compression room 204 in the middle of compression rises more unusually than the pressure of the discharge room 224 While a compression refrigerant pushes up the bypass valve 208 through the bypass hole 207 established in the fixed scroll member 230 and flows into the discharge room 224, the fixed scroll member 230 retreats to the main part 201b side of a panel, extends the direction crevice of an axis between the compression rooms 204, and will be in the same state as drawing 6.

[0137] As a result, the pressure of the compression room 204 descends in an instant, and compression load reduces. The pressure of the compression room 204 will be in the state of drawing 2 again, after returning to a normal value.

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[0138] In addition, when liquid compression of the grade to which the fixed scroll member 230 cannot retreat to the main part 201b side of a panel occurs, the bypass valve 208 opens, the bypass valve 208 and the discharge valve 236 are close, and bypass gas is held temporarily. When the pressure of this bypass gas exceeds a preset value, this bypass gas pressure power pushes up the discharge valve 236 for a while, just before the compression room 204 nearest to the discharge mouth 205 carries out an opening to the discharge mouth 205, the blockade of the discharge mouth 205 is canceled, and fault compression in the discharge mouth 205 is prevented.

[0139] Moreover, also when fault compression arises at 1st scroll type compressor guard 100, through the bypass hole 107, bypass valve equipment 108 carries out a valve-opening operation, and carries out electrical overload mitigation.

[0140] Until the discharge valve gear 106 and the discharge valve gear 206 immediately after a compressor stop close the valve The 1st scroll type compressor style 100 and the 2nd scroll type compressor style tend to act as an expansion machine according to the pressure difference of the electric motor room 116 and the compression room 104, and the pressure difference of the discharge room 224 and the compression room 204, and the revolution scrolling 102 and the revolution scrolling 202 tend to carry out reverse revolution respectively.

[0141] However, since the direction of a volume of the swirl of the revolution scrolling 102 and the revolution scrolling 202 is the same, each other is offset mutually and reverse rotation of a driving shaft 2 does not arise.

[0142] (Work example 3) Next, series connection of the 1st scroll type compressor style 100 and the 2nd scroll type compressor style 200 is carried out, and the case (when high compression ratio operation is needed) where two-step compression operation is carried out is explained.

[0143] In drawing 2, it connects with the lower stream side (low-pressure side) of the evaporator of a frozen cycle, the outlet side of the 1st discharge pipe 127 is connected to the 2nd inhalation pipe 223, and the 1st inhalation pipe 123 is connected to the upper stream side (high-pressure side) of a condensation machine whose 2nd discharge pipe 227 is a frozen cycle.

[0144] The refrigerant gas compressed at 1st scroll type compressor guard 100 is temporarily sent out to the compressor exterior from the 1st discharge pipe 127 through the gas passage explained in the work example 1.

[0145] After the refrigerant gas by which preliminary cooling was carried out by the compressor external piping system flows into the 2nd scroll type compressor style 200 through the 2nd inhalation pipe 223 and is compressed further, it is sent out to the condensation machine of a frozen cycle through the discharge room 224.

[0146] The thrust power of acting on the revolution scrolling 202 with the pressure of the compression room 204 is supported by the thrust block 209.

[0147] This thrust power is reduced in response to as equivalent to pressure (2kg/cm<sup>2</sup> following) energization power as \*\* of the lubricating oil supplied to the back pressure room 212 from the TOROKOIDO type pumping installation 110.

[0148] In addition, the capacity of the compression room 204 of the 2nd scroll type compressor style 200 is set up so that the refrigerant gas volume discharged from the 1st scroll type compressor style 100 can be taken in the neither more nor less.

[0149] Specifically, the taking-in capacity of the compression room 204 of the 2nd scroll type compressor style 200 is set to the capacity of the compression room 104 of the 1st scroll type compressor style 100 0.4 to 0.6 time the ratio of taking in.

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[0150] This ratio can choose the optimal value according to the characteristic of a refrigerant, the arrangement position of bypass valve equipment, the revolving speed range of an electric motor, the pressure conditions of a frozen cycle, etc.

[0151] When the pressure of the discharge room 224 carries out an abnormal rise, compression load carries out a sudden increase and the 2nd scroll type compressor style 200 and electric motor 3 carry out an abnormal temperature rise. While the energization power of the coiled spring 241 declined, when the pressure difference of the 2nd sump 217 and the 1st sump 117 becomes beyond a preset value, the valve element 240 of the corundum which blockades the end of the iris diaphragm passage 239 retreats to the coiled spring 241 side, lubricating oil of the 2nd sump 217 is decompressed, and it returns to the 1st sump 117.

[0152] When the pressure difference of the 2nd sump 217 and the 1st sump 117 carries out an abnormal rise, a valve element 240 extracts, it becomes impossible to blockade a passage 239, the high-pressure refrigerant gas of the discharge room 224 extracts, it reveals to the 1st sump 117 through a passage 239, and continuation of the unusual pressure increase of the discharge room 224 is prevented.

[0153] In addition, when the discharge room 224 carries out an unusual pressure increase, the panel 230b of the fixed scroll member 230 contacts to a middle-sized board 228 strongly. However, the direction contact of an axis with the fixed scroll member 230 and the revolution scrolling 202 does not arise.

[0154] Since it is the same as that of a work example 1 about the flow of lubricating oil other than the above, explanation is omitted.

(Work example 4) Next, starting and the mode-of-operation change procedure of the 1st scroll type compressor style 100 and the 2nd scroll type compressor style 200 are explained.

[0155] First, also in which mode of operation of a work example 1 (individual operation), a work example 2 (parallel run), and a work example 3 (two-step compression operation), it starts from frozen cycle piping system connection of a work example 1 at the time of starting of this compressor. By it, compressor starting load is made small and the starting current of an electric motor 3 is lessened.

[0156] When carrying out a mode-of-operation change from a work example 1 at a work example 2, after making an electric motor 3 low-speed operation (when changing from individual operation to a parallel run), the 2nd inhalation pipe 223 is gradually changed to the connection piping system of the 1st inhalation pipe 123. That is, the pressure of the inhalatorium 222 of the 2nd scroll type compressor style 200 is gradually changed from high pressure to low pressure. By it, axial directional movement of the fixed scroll member 230 is carried out gradually, the compression room 204 is sealed and starting load of the 2nd scroll type compressor style 200 is made small.

[0157] After starting of the 2nd scroll type compressor style 200 controls the operating speed of an electric motor 3 in the necessary range.

[0158] (when changing from individual operation to two-step compression operation) when carrying out a mode-of-operation change from a work example 1 at a work example 3. The piping system of the discharge pipe 227 is changed to the high-pressure side rather than the piping system of the 1st discharge pipe 127 and the 2nd inhalation pipe 223, and it connects at the same time it intercepts the piping system of the 2nd discharge pipe 227 with an electromagnetic valve from the piping system of the 1st discharge pipe 127 and the 2nd inhalation pipe 223, after

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making an electric motor 3 low-speed operation.

[0159] When carrying out a mode-of-operation change from a work example 2 at a work example 3, after returning the mode of operation to the state of a work example 2 to the work example 1 (when changing from a parallel run to two-step compression operation), it changes to a work example 3. That is, after connecting the 2nd inhalation pipe 223 to the piping system of the 1st discharge pipe 127 and the 2nd discharge pipe 227, you make it delayed and it changes from a work example 1 to the mode of operation of a work example 3.

[0160] The rapid load change which acts on an electric motor 3 is avoided by these mode-of-operation changes, and generating of superfluous current is prevented.

[0161] When carrying out a mode-of-operation change from a work example 2 at a work example 1, after making an electric motor 3 low-speed operation (when changing from a parallel run to individual operation), the piping system of the 2nd inhalation pipe 223 is connected to the piping system of the 1st discharge pipe 127 and the 2nd discharge pipe 227 with an electromagnetic valve in an instant. Then, an electric motor 3 is controlled in the necessary operation range.

[0162] When carrying out a mode-of-operation change from a work example 3 at a work example 1, after making an electric motor 3 low-speed operation (when changing from two-step compression operation to individual operation), the 2nd discharge pipe 227 is gradually connected to the connection piping system of the 1st discharge pipe 127 and the 2nd inhalation pipe 223. Loss of a frozen cycle can be lessened by this.

[0163] When carrying out a mode-of-operation change from a work example 3 at a work example 2, after changing the mode of operation to the individual operation of a work example 1 (when changing from two-step compression operation to a parallel run), it changes to the mode of operation of a work example 2.

[0164] (Work example 5) Although the above-mentioned work example explained the case where a compression mechanism part was a scroll type, the case where made the 1st compressor style into the rolling piston type rotary type, and the 2nd compressor style is made into the same scroll type as the above is explained.

[0165] In drawing 7, an axle hole 303 and a side board 330 are arranged at the both sides of a cylinder block 301, a piston 302 is fitted in the crankshaft of the driving shaft 2a connected with an electric motor 3, and interior arrangement of the 1st rotary type compressor style 300 is carried out into the cylinder of a cylinder block 301.

[0166] The driving shaft 2a is supported by only the main guide bearing 311 of the axle hole 303, trochoid pump equipment 310 is arranged at a side board 350, and the pumping action of it is carried out by rotation of a driving shaft 2a.

[0167] The driving shaft 2a is formed in the axial form which can be inserted in main guide bearing 311, a piston 302, and the inner rotor of the TOROKOIDO type pumping installation 310 one by one.

[0168] The discharge valve gear 306 is arranged at the side board 330. The pump case 350 equipped with the oil suction hole 315, admission port, and discharge mouth of the TOROKOIDO type pumping installation 310 is arranged at the side board 330.

[0169] Since other composition and operations are well-known matters, they omit explanation. In addition, although the above-mentioned work example explained the 1st compressor style about the case of the rolling piston type rotary type, the case of other rotary type compressors is

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sufficient.

[0170] (Work example 6) The above-mentioned work example explained the compressor which arranged each compressor style in the both sides of an electric motor 3 as a work example about seal / release operation of the compression room in the 2nd scroll type compressor style 200.

[0171] However, seal / release mechanism of the compression room in this 2nd scroll type compressor style 200 can be developed in an airtight container to an electric motor and the scroll type compressor of the conventional method which has arranged the scroll type compressor style, for example, as shown in drawing 8 . Since empty operation is unnecessary, the compressor in this case needs to change into about 0.1mm the maximum distance to which a fixed scroll member deserts revolution scrolling from 5mm of the above-mentioned conventional example.

[0172] By estrangement distance setup of this level, compression load in early stages of compressor starting can be made small.

[0173] That is, it can go up gradually, a fixed scroll member can move to the revolution scrolling side, and discharge pressure can make the direction crevice of an axis between compression rooms seal with the time progress after compressor starting. By such a starting means, miniaturization of an electric motor and low vibration-ization in early stages of starting can be attained.

[0174] when it applies to the compressor for vehicles air-conditioning equipped with the electromagnetic clutch which drives the compressor style of this composition with a vehicles engine, the safe driving at the time of vehicles high speed operation and an operation feeling are markedly alike, and are improved -- I will come out.

[0175] That is, since the load to the vehicles engine immediately after connecting an electromagnetic clutch at the time of high speed operation is small, a sudden slowdown of vehicles does not arise.

[0176] In addition, although the 2nd compressor style was made into the scroll type in the above-mentioned work example, the side board (330) of a rotary type compressor style like the 1st rolling piston type rotary type compressor style 300 of drawing 7 can also be transposed to the 2nd rolling piston type rotary type compressor style made to carry out movable in the direction of an axis.

[0177] Moreover, although the above-mentioned work example explained the refrigerant compressor, an operation and an effect with the same said of the case of the gas compressor which compresses other gas (for example, oxygen, nitrogen, a helium, air, etc.) are produced.

[0178]

[Effect of the Invention] From the above-mentioned work example, like [ it is \*\*\*\*\* and ] [ invention according to claim 1 ] In the gas compressor which has arranged the 1st compression mechanism part and the 2nd compression mechanism part which operate with the driving shaft connected with an electric motor at the both sides of an electric motor single in an airtight container, and an electric motor It is the arranged thing equipped with the function to enable the pause of a compression operation of the compression mechanism part substantially by controlling in order to extend the direction crevice of a compression room axis between one compression mechanism parts. A gaseous pumping action can be avoided without according to this composition, the lower stream side being open for free passage, and the upper stream side in the compression interior of a room of the compression mechanism part which the direction crevice of a compression room axis was able to extend also producing circulation of the gas in

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the compression interior of a room. As a result, a plant shutdown can be carried out without producing compression loss of one compression mechanism part, and high compression operation of efficiency according to load can be realized.

[0179] Invention according to claim 2 carries out series connection of the 1st compression mechanism part and the 2nd compression mechanism part, and sets up the gas exclusion capacity of the 1st compression mechanism part and the 2nd compression mechanism part possible [ two step compression operation ]. The 2nd compression mechanism part which becomes the high rank side at the time of two-step compression operation was made to be equipped with the function which can be compression operation stopped, according to this composition, the compression operation only of the 1st compression mechanism part is carried out, it is made one-step compression operation, and the usual compression ratio operation is attained. Moreover, series connection of the 1st compression mechanism part and the 2nd compression mechanism part is carried out, and a compression operation is carried out, it is made two-step compression operation, and high compression ratio operation is attained. Two kinds of this mode of operation is chosen suitably, and efficient compression operation can be realized in the large load range covering a low compression ratio - a quantity compression ratio.

[0180] Revolution scrolling which invention according to claim 3 carries out sliding engagement of the 2nd compression mechanism part in which a compression operation pause is possible at a driving shaft, and circles, It is what made the scroll type compression mechanism part which consists of the fixed scroll element which gets into gear to revolution scrolling and forms a compression room, and was considered as controllable composition in order to equip a fixed scroll element with the function in which axial directional movement is possible and to extend the direction crevice of a compression room axis. According to this composition, when fault compression arises at the compression room of the 2nd compression mechanism part, a fixed scroll element deserting revolution scrolling, the direction crevice of a compression room axis spreading, and compression room pressure power declining, and making an electrical overload reduce carries out. Moreover, since it can perform a substantial compression pause, without producing the pressure increase of a compression room in carrying out expansion control of the direction crevice of a compression room axis further, utilization of \*\*\*\*\* is attained in load mitigation and -cum- [ a part of / plant shutdown ].

[0181] Invention according to claim 4 [ a fixed scroll element ] It consists only in the direction of an axis of the fixed scroll member which can move to the main part of a panel that the direction crevice of an axis between the main part of a panel fixed to the airtight container and the compression room geared and formed in revolution scrolling should be sealed and canceled. A fixed scroll member is what deserted revolution scrolling according to the energization power of spring rigging, and was constituted by revolution scrolling according to the high-pressure gas pressure power in an airtight container that approach movement should be carried out. When fault compression arises at the compression room of the 2nd compression mechanism part according to this composition According to compression room pressure power and the energization power of spring rigging, a fixed scroll element resists the energization power by the high-pressure gas pressure power in an airtight container, desert revolution scrolling, and the direction crevice of a compression room axis spreads. While continuation of the fault compression to which compression room pressure power is reduced can be made to be able to avoid and compressor breakage can be prevented, a fixed scroll member can approach revolution

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scrolling, can make the direction crevice of a compression room axis able to seal automatically in response to the high-pressure gas pressure power in an airtight container, and can raise compression efficiency. Moreover, by controlling so that the gas pressure power in the airtight container which energizes a fixed scroll member to the revolution scrolling side declines A fixed scroll member is made to desert revolution scrolling according to the energization power of spring rigging, the direction crevice of a compression room axis is enlarged extremely, and a compression function can be stopped automatically, without stopping an electric motor.

[0182] Revolution scrolling which invention according to claim 5 carries out sliding engagement of the 2nd compression mechanism part in which a compression operation pause is possible at a driving shaft, and circles, It sets in controllable composition in order consider it as the scroll type compression mechanism part which consists of the fixed scroll element which gets into gear to revolution scrolling and forms a compression room, to equip a fixed scroll element with the function in which axial directional movement is possible and to extend the direction crevice of a compression room axis. It is what the main part of a panel constituted so that it may divide the inside of an airtight container into the 1st compression mechanism part, the electric motor room which stores an electric motor, and the discharge room of the 2nd compression mechanism part. According to this composition, without receiving the differential pressure of an electric motor room and the discharge room of the 2nd compression mechanism part in a fixed scroll member directly, the main part of a panel is made to win popularity, modification of a fixed scroll member can be lessened, and the sealing performance of a compression room can be improved.

[0183] Revolution scrolling which invention according to claim 6 carries out sliding engagement of the 2nd compression mechanism part in which a compression operation pause is possible at a driving shaft, and circles, While it is considered as the scroll type compression mechanism part which consists of the fixed scroll element which gets into gear to revolution scrolling and forms a compression room, and having controllable composition in order to equip a fixed scroll element with the function in which axial directional movement is possible and to extend the direction crevice of a compression room axis In the composition with which the main part of a panel divides the inside of an airtight container into the electric motor room which stores the 1st compression mechanism part and electric motor, and the discharge room of the 2nd compression mechanism part Between the sumps of the bottom of an electric motor room, and the bottom of the discharge room of the 2nd compression mechanism part The oil return passage which has the iris diaphragm passage which permits only an inflow in an electric motor room is arranged. An oil return passage consists of the spring rigging which extracts the valve element and valve element which open and close an iris diaphragm passage, and is energized toward the upper stream side of a passage, and [ spring rigging ] While energization power is reduced, and having the shape memory characteristic of maintaining the energization power when the temperature of itself is under a preset value if the temperature of itself exceeds a preset value When it was what brought spring rigging close to the coil winding of an electric motor, and has arranged it, and the pressure and temperature of a discharge room carry out an abnormal rise at the time of two-step compression operation according to this composition, While coil winding carries out an abnormal temperature rise and the energization power of spring rigging becomes small by the over-current to an electric motor Since it moves in the direction which a valve element opens and an oil return passage is opened for traffic by the differential pressure of the sump of a discharge room, and an electric motor room While returning the discharge gas contained in lubricating oil

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and lubricating oil to an electric motor room from the sump of the bottom of the discharge room of the 2nd compression mechanism part, the normal return of the pressure of a discharge room can be carried out, electrical overload mitigation can be carried out, and the operation efficiency by continuous operation of a compressor can be raised.

[0184] Invention according to claim 7 [ a fixed scroll element ] It consists only in the direction of an axis of the fixed scroll member which can move to the main part of a panel that the direction crevice of an axis between the main part of a panel fixed to the airtight container and the compression room geared and formed in revolution scrolling should be sealed and canceled. In the composition which a fixed scroll member deserts revolution scrolling according to the energization power of spring rigging, and carries out approach movement according to the high-pressure gas pressure power in an airtight container at revolution scrolling The panel with which the fixed scroll member stopped on the main part of a panel, and hand-of-cut movement was prevented, The fixed scroll lap which is arranged on the whole surface of a panel, and gears with the revolution scroll lap of revolution scrolling, and forms a compression room, It is the thing which it consisted of the cylinder part of the panel arranged upwards on the other hand, and the cylinder part carried out fit-in ON into the main part of a panel, and has arranged spring rigging between a cylinder part and the main part of a panel, made spring energization power give a fixed scroll member, and made the cylinder part energize the high-pressure gas pressure power in an airtight container. According to this composition, the compressor style which may operate certainly seal and release of a compression room of the direction crevice of an axis according to the difference of the power of Banneker who makes a fixed scroll member desert revolution scrolling in the direction of an axis, and both of gas pressure power, who bring a fixed scroll member in the direction of an axis close at revolution scrolling, is realizable.

[0185] Invention according to claim 8 forms a discharge gas passage inside a cylinder part that a discharge valve gear should be arranged. While arranging a bypass valve to a compression room side rather than a discharge valve gear, and a bypass valve's opening and closing the outlet side of the bypass hole arranged in the panel that between a compression room and discharge rooms should be opened for free passage and permitting the gas outflow of only a compression room to a discharge room It is what carried out arrangement composition of a bypass valve and the discharge valve gear so that a discharge valve gear might contact a bypass valve and the outflow gas from a bypass hole might be blockaded temporarily, when a bypass valve opened. Since according to this composition a bypass valve opens at the time of slight fault compression operation, a part of gas of a compression room moves to another space and compression room pressure power declines temporarily, a compression operation can be made to continue also in the time of fault compression generating. Moreover, since the gas temporarily confined in another space brings forward valve opening of a discharge valve gear with the pressure, it can prevent the discharge mouth internal pressure power rise produced from valve-opening delay of the discharge valve gear produced with a discharge mouth, and can also reduce a compression input.

[0186] Invention according to claim 9 forms a discharge gas passage inside a cylinder part that a discharge valve gear should be arranged. While arranging a bypass valve to a compression room side rather than a discharge valve gear, and a bypass valve's opening and closing the outlet side of the bypass hole arranged in the panel that between a compression room and discharge rooms should be opened for free passage and permitting the gas outflow of only a compression room to



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a discharge room In the composition which has arranged the bypass valve and the discharge valve gear so that a discharge valve gear may contact a bypass valve and the outflow gas from a bypass hole may be blockaded temporarily, when a bypass valve opens Accomplish a bypass valve and the annular form of a thin board of having the connection way which turns into a bypass gas passage inside [ the valve element of a discharge valve gear ] It is what carried out arrangement composition so that the annular form of a thin board of having a connection way used as a discharge gas passage might be accomplished outside and the above-mentioned re-connection way might not overlap with it. According to this composition, the gas temporarily bypassed from the compression room can be simply sealed with the combination of the valve element of a discharge valve gear, and a bypass valve, early valve opening of a discharge valve gear can be promoted using that gas pressure power, and fault compression in the compression last distance can be prevented.

[0187] Invention according to claim 10 forms a discharge gas passage inside a cylinder part that a discharge valve gear should be arranged. While arranging a bypass valve to a compression room side rather than a discharge valve gear, and a bypass valve's opening and closing the outlet side of the bypass hole arranged in the panel that between a compression room and discharge rooms should be opened for free passage and permitting the gas outflow of only a compression room to a discharge room In the composition which has arranged the bypass valve and the discharge valve gear so that a discharge valve gear may contact a bypass valve and the outflow gas from a bypass hole may be blockaded temporarily, when a bypass valve opens When the pressure of the space where the outflow gas from a bypass hole was blockaded temporarily exceeds a preset value, it is what gave spring energization power to the valve element of the discharge valve gear that a discharge valve gear should open according to the gas pressure power of the blockade space. According to this composition, it can prevent that a discharge valve gear opens superfluously and the gas of a discharge room flows backwards in a compression room through a discharge mouth according to the gas pressure power which flowed out of the bypass hole.

[0188] Invention according to claim 11 forms a discharge gas passage inside a cylinder part that a discharge valve gear should be arranged. While arranging a bypass valve to a compression room side rather than a discharge valve gear, and a bypass valve's opening and closing the outlet side of the bypass hole arranged in the panel that between a compression room and discharge rooms should be opened for free passage and permitting the gas outflow of only a compression room to a discharge room In the composition which has arranged the bypass valve and the discharge valve gear so that a discharge valve gear may contact a bypass valve and the outflow gas from a bypass hole may be blockaded temporarily, when a bypass valve opens With the spring rigging arranged at the discharge gas passage, spring energization power is energized and [ spring rigging ] It is what was equipped with the increase of energization power, and the shape memory characteristic which will reduce energization power if a temperature fall is carried out when the temperature of itself carried out the rise in heat. Since according to this composition discharge gas pressure power and temperature rise and the time from valve opening of a discharge valve gear to valve closing is shortened, the discharge gas adverse current to a compression room from a discharge mouth is lessened, and compression loss by re-compressing expansion gas can be lessened.

[0189] Invention according to claim 12 [ a fixed scroll member ] The fixed scroll lap which is

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arranged on the whole surface of the panel with which it stopped on the main part of a panel, and hand-of-cut movement was prevented, and a panel, and gears with the revolution scroll lap of revolution scrolling, and forms a compression room, Consist of the cylinder part of a panel arranged upwards on the other hand, and a cylinder part carries out fit-in ON into the main part of a panel. In the composition which has arranged spring rigging between a cylinder part and the main part of a panel, made spring energization power give a fixed scroll member, and made the cylinder part energize the high-pressure gas pressure power in an airtight container It is the thing which formed the discharge gas passage inside the cylinder part that a discharge valve gear should be arranged, and made \*\*\*\*\* of the discharge gas passage approach the surface-of-a-sphere form end mirror wall surface of an airtight container. According to this composition, the discharge gas which collided with the surface-of-a-sphere form end mirror wall surface distributes in all the directions. Since the lubricating oil which stagnates in the bottom of a discharge room is spread into discharge gas, and it mixes in discharge gas, and can flow into the compressor exterior, it can mix in gas and lubricating oil can be again returned to an electric motor room, lubricating oil insufficient generating of the electric motor interior of a room can be prevented.

[0190] Invention according to claim 13 [ a fixed scroll element ] It consists only in the direction of an axis of the fixed scroll member which can move to the main part of a panel that the direction crevice of an axis between the main part of a panel fixed to the airtight container and the compression room geared and formed in revolution scrolling should be sealed and canceled. A fixed scroll member deserts revolution scrolling according to the energization power of spring rigging, and in the composition which carries out approach movement to revolution scrolling according to the high-pressure gas pressure power in an airtight container [ spring rigging ] It is the thing equipped with the shape memory characteristic in which energization power will carry out a sudden increase if the temperature of itself exceeds preset temperature. It becomes larger than the gas pressure power which the energization power and compression room pressure power of spring rigging energize to the fixed scroll member revolution scrolling-side, when the 2nd compression mechanism part is overheated according to this composition. A fixed scroll member can desert revolution scrolling in the direction of an axis, can make seal of a compression room able to cancel, can reduce the load of the 2nd compression mechanism part, and printing can be prevented.

[0191] Invention according to claim 14 [ a fixed scroll member ] The fixed scroll lap which is arranged on the whole surface of the panel with which it stopped on the main part of a panel, and hand-of-cut movement was prevented, and a panel, and gears with the revolution scroll lap of revolution scrolling, and forms a compression room, Consist of the cylinder part of a panel arranged upwards on the other hand, and a cylinder part carries out fit-in ON into the main part of a panel. In the composition which has arranged spring rigging between a cylinder part and the main part of a panel, made spring energization power give a fixed scroll member, and made the cylinder part energize the high-pressure gas pressure power in an airtight container When a fixed scroll member deserts the main part of a panel, the panel back space formed between the panel of a fixed scroll member and the main part of a panel is what established a means by which it was open for free passage in an income room. Since according to this composition the gas of panel back space flows into an inhalatorium and movement of a fixed scroll member becomes easy when a fixed scroll member carries out estrangement movement in the direction of an axis from

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revolution scrolling, load mitigation speed can be brought forward and input loss can be lessened at the time of fault compression.

[0192] Invention according to claim 15 [ a fixed scroll element ] It consists only in the direction of an axis of the fixed scroll member which can move to the main part of a panel that the direction crevice of an axis between the main part of a panel fixed to the airtight container and the compression room geared and formed in revolution scrolling should be sealed and canceled. In the composition which a fixed scroll member deserts revolution scrolling according to the energization power of spring rigging, and carries out approach movement according to the high-pressure gas pressure power in an airtight container at revolution scrolling When a fixed scroll member carries out approach movement according to the high-pressure gas pressure power in an airtight container at revolution scrolling, [ that the direction contact of an axis with a fixed scroll member and revolution scrolling should be avoided ] It is what served as the member of the moving range regulation means of revolution scrolling that the moving range regulation means of a fixed scroll member should be established, and the member of a moving range regulation means should avoid the direction contact of an axis with revolution scrolling and a fixed scroll member. According to this composition, the direction contact of an axis of a fixed scroll member and revolution scrolling is made to avoid, and friction loss can be lessened. Moreover, a smooth circular movement can be carried out to revolution scrolling, and oscillating generating can be controlled.

[0193] When a fixed scroll member carries out approach movement of the invention according to claim 16 according to the high-pressure gas pressure power in an airtight container at revolution scrolling, [ that the direction contact of an axis with a fixed scroll member and revolution scrolling should be avoided ] In the composition which served as the member of the moving range regulation means of revolution scrolling that the moving range regulation means of a fixed scroll member should be established, and the member of a moving range regulation means should avoid the direction contact of an axis with revolution scrolling and a fixed scroll member The main part frame which has the thrust block which carries out the direction support of an axis of the revolution scrolling with the main guide bearing which supports a driving shaft, It is what has arranged the member of a moving range regulation means between the main parts of a panel, and pinched revolution scrolling in the direction of an axis by the thrust block and the member of the moving range regulation means. According to this composition, the state where the fixed scroll member deserted revolution scrolling is also stabilized, and can carry out revolution operation of the revolution scrolling, and breakage of revolution scrolling by the collision with an associated part can be prevented.

[0194] Revolution scrolling which invention according to claim 17 carries out sliding engagement of the 2nd compression mechanism part in which a compression operation pause is possible at a driving shaft, and circles, While it is considered as the scroll type compression mechanism part which consists of the fixed scroll element which gets into gear to revolution scrolling and forms a compression room, and making control possible in order to equip a fixed scroll element with the function in which axial directional movement is possible and to extend the direction crevice of a compression room axis In the composition with which the main part of a panel divides the inside of an airtight container into the electric motor room which stores the 1st compression mechanism part and electric motor, and the discharge room of the 2nd compression mechanism part [ a means by which the rotation stop of the fixed scroll member is

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carried out at the main part of a panel ] While making the guide pin fixed to the fit-in hole established in the fixed scroll member by the main part of a panel fit in and making a fit-in hole open for free passage to the inhalation side It is what established the means which carries out differential pressure oil supply of the lubricating oil of the sump arranged in the bottom of a discharge room in a fit-in hole, and according to this composition, axial directional movement of the fixed scroll member can be carried out smoothly, and speeding up of seal and release of a compression room can be attained. Moreover, wear of a guide pin can be lessened, the rotation of fixed scrolling can be prevented, and the airtightness of a compression room can be secured.

[0195] [ a means by which the rotation stop of the fixed scroll member is carried out at the main part of a panel as for invention according to claim 18 ] While making the guide pin fixed to the fit-in hole established in the fixed scroll member by the main part of a panel fit in and making a fit-in hole open for free passage to the inhalation side In the composition which established the means which carries out differential pressure oil supply of the lubricating oil of the sump arranged in the bottom of a discharge room in a fit-in hole It is the thing which made the perimeter part space which isolated from the sump in pressure and was formed open a fit-in hole for free passage that the lap support disk on which the revolution scroll lap of revolution scrolling was made based should be pinched by the main part frame and the member of a moving range regulation means. While carrying out axial directional movement of the fixed scroll member smoothly, it can be made to circle in revolution scrolling smoothly to the lubricating oil which flowed into perimeter part space according to this composition.

[0196] [ a means by which the rotation stop of the fixed scroll member is carried out at the main part of a panel as for invention according to claim 19 ] While making the guide pin fixed to the fit-in hole established in the fixed scroll member by the main part of a panel fit in and making a fit-in hole open for free passage to the inhalation side [ the means which carries out differential pressure oil supply from a sump in a fit-in hole ] in the composition which established the means which carries out differential pressure oil supply of the lubricating oil of the sump arranged in the bottom of a discharge room in a fit-in hole While making the main part of a panel carry out penetration insertion fixation of the guide pin, it is what made the penetration insertion part the iris diaphragm passage of the differential pressure oil supply passage, and according to this composition, the simple differential pressure oil supply means for carrying out axial directional movement of the fixed scroll member smoothly is realizable.

[0197] When a fixed scroll member carries out approach movement of the invention according to claim 20 according to the high-pressure gas pressure power in an airtight container at revolution scrolling, [ that the direction contact of an axis with a fixed scroll member and revolution scrolling should be avoided ] [ that the moving range regulation means of a fixed scroll member should be established, and the member of a moving range regulation means should avoid the direction contact of an axis with revolution scrolling and a fixed scroll member ] while serving as the member of the moving range regulation means of revolution scrolling The main part frame which has the thrust block which carries out the direction support of an axis of the revolution scrolling with the main guide bearing which supports a driving shaft, In the composition which has arranged the member of a moving range regulation means between the main parts of a panel, and pinched revolution scrolling in the direction of an axis by the thrust block and the member of the moving range regulation means A level difference is prepared between the field where the panel of a scroll member contacts the member of a moving range regulation means, and the tip of

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a fixed scroll lap. [ are what was considered as the composition which can adjust the direction minimum clearance of an axis of a fixed scroll member and revolution scrolling by setting up so that a level difference may serve as board thickness Sayori smallness of the member of a moving range regulation means, and choosing the thickness of the member of a moving range regulation means according to a level difference, and / according to this composition ] The direction crevice of an axis between the compression rooms formed by the fixed scroll member which moves in the direction of an axis, and revolution scrolling can be secured minutely, and the sealing performance of a compression room can be secured.

[0198] When a fixed scroll member carries out approach movement of the invention according to claim 21 according to the high-pressure gas pressure power in an airtight container at revolution scrolling, [ that the direction contact of an axis with a fixed scroll member and revolution scrolling should be avoided ] In the composition which served as the member of the moving range regulation means of revolution scrolling that the moving range regulation means of a fixed scroll member should be established, and the member of a moving range regulation means should avoid the direction contact of an axis with revolution scrolling and a fixed scroll member Since the member of the moving range regulation means was made into the quality of the material harder than it while making revolution scrolling and a fixed scroll member into this quality of the material Since according to this composition the Ryobe article carries out a dimensional change similarly and change of a compression room crevice decreases when a revolution scroll member and a fixed scroll member carry out a temperature change according to a compressor operating speed or load conditions, the sealing performance of a compression room can be held. Moreover, the endurance of a slide contact side with the member of a moving range regulation means can be improved.

[0199] [ invention ] while invention according to claim 22 supplies some lubricating oil which the driving shaft drove the capacity type pumping installation arranged in the 1st compression mechanism part, and sucked up from the sump to said 1st compression mechanism part In the composition which prepared the oil supply passage which supplies the remaining lubricating oil to the 2nd compression mechanism part through penetration \*\*\*\* prepared in the direction of an axis of said driving shaft It is that to which the lubricating oil supplied to the 2nd compression mechanism part equipped the oil passage which returns to a sump through a sliding part, and the oil passage which carries out a differential pressure inflow through the sliding part of the 2nd compression mechanism part at the inhalation side with the oil supply passage which carries out a part style, and according to this composition, the endurance of a compression mechanism part is securable also in the time of empty compression operation.

[0200] In the gas compressor which has arranged the 1st compression mechanism part and the 2nd compression mechanism part which operate with the driving shaft connected with an electric motor at the both sides of an electric motor with invention [ according to claim 23 ] single in an airtight container, and an electric motor In the arranged composition equipped with the function to enable the pause of a compression operation of the compression mechanism part substantially by controlling in order to extend the direction crevice of a compression room axis between one compression mechanism parts It is what was considered as the axle hole composition by which each axis end part of after fit-in fixation and a driving shaft can insert a driving shaft in the 1st compression mechanism part and each main guide bearing of the 2nd compressor style from one way, and a cantilevered suspension assembly is carried out to the rotation child of an electric

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motor. Since according to this composition the assembly of a driving shaft and each compression mechanism part becomes easy and it becomes easy to unite the center of each compressor style and a driving shaft, per Kata of the main-guide-bearing sliding part by assembly axis gap can be prevented, and input loss and a sliding part endurance fall can be prevented.

[0201] In the gas compressor which has arranged the 1st compression mechanism part and the 2nd compression mechanism part which operate with the driving shaft connected with an electric motor at the both sides of an electric motor with invention [ according to claim 24 ] single in an airtight container, and an electric motor In the arranged composition equipped with the function to enable the pause of a compression operation of the compression mechanism part substantially by controlling in order to extend the direction crevice of a compression room axis between one compression mechanism parts While making the 1st compression mechanism part and the 2nd compressor style into a scroll type compressor style It is what made the same the direction of a swirl of the revolution scroll lap of revolution scrolling of both the compression mechanism part. Until the discharge valve gear immediately after a compressor stop closes a discharge mouth according to this composition Since each revolution scrolling is connected with the driving shaft when each revolution scrolling tends to reverse-rotate in each direction by the differential pressure of an electric motor room, a discharge room, and a compression room, reverse rotation of a drive system can be prevented, breakage of parts and the lubricous oil spill of an axle hole part can be prevented, and endurance can be improved.

[0202] Revolution scrolling which invention according to claim 25 carries out sliding engagement of the 2nd compression mechanism part in which a compression operation pause is possible at a driving shaft, and circles, While it is considered as the scroll type compression mechanism part which consists of the fixed scroll element which gets into gear to revolution scrolling and forms a compression room, and having controllable composition in order to equip a fixed scroll element with the function in which axial directional movement is possible and to extend the direction crevice of a compression room axis In the composition with which the main part of a panel divides the inside of an airtight container into the electric motor room which stores the 1st compression mechanism part and electric motor, and the discharge room of the 2nd compression mechanism part When operating only the 1st compression mechanism part, it is what was made to open the electric motor room, discharge room [ of the 2nd compression mechanism part ], and inhalation side of the 2nd compression mechanism part for free passage, and carried out this space made to open for free passage the discharge side of the 1st compression mechanism part. According to this composition, it can change into a compression plant shutdown state, without making a fixed scroll member desert revolution scrolling in the direction of an axis, canceling seal of a compression room, and stopping an electric motor according to the energization power of spring rigging, after the 2nd discharge room and compression room of a compression mechanism part have carried out \*\* pressure.

[0203] While invention according to claim 26 makes the 1st compression mechanism part and the 2nd compressor style a scroll type compressor style In the composition which made the same the direction of a swirl of the revolution scroll lap of revolution scrolling of both the compression mechanism part It is what is controlled in order to start the 2nd compression mechanism part at the time of operation starting of the 1st compression mechanism part and the 2nd compression mechanism part, after stopping the 2nd compression mechanism part and starting the 2nd compression mechanism part. Since according to this composition compression starting load

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reduces and electric motor striking current can be lessened, the miniaturization of an electric motor can be attained.

[0204] Revolution scrolling which invention according to claim 27 carries out sliding engagement of the 2nd compression mechanism part in which a compression operation pause is possible at a driving shaft, and circles, While it is considered as the scroll type compression mechanism part which consists of the fixed scroll element which gets into gear to revolution scrolling and forms a compression room, and having controllable composition in order to equip a fixed scroll element with the function in which axial directional movement is possible and to extend the direction crevice of a compression room axis In the composition with which the main part of a panel divides the inside of an airtight container into the electric motor room which stores the 1st compression mechanism part and electric motor, and the discharge room of the 2nd compression mechanism part When carrying out series connection of the 1st compression mechanism part and the 2nd compression mechanism part and changing the 1st compression mechanism part and the 2nd compression mechanism part to two-step compression operation after a parallel run, It is what controls the 2nd compression mechanism part in order to carry out series connection of the 1st compression mechanism part and the 2nd compression mechanism part after a plant shutdown. Since the rapid load change which acts on the electric motor at the time of two-step compression operation starting is avoidable according to this composition, quiet operation of vibration or the temporary unusual noise generating can be controlled and carried out.

[0205] Revolution scrolling which invention according to claim 28 carries out sliding engagement of the 2nd compression mechanism part in which a compression operation pause is possible at a driving shaft, and circles, While constituting possible [ control ] in order consider it as the scroll type compression mechanism part which consists of the fixed scroll element which gets into gear to revolution scrolling and forms a compression room, to equip a fixed scroll element with the function in which axial directional movement is possible and to extend the direction crevice of a compression room axis In the composition with which the main part of a panel divides the inside of an airtight container into the electric motor room which stores the 1st compression mechanism part and electric motor, and the discharge room of the 2nd compression mechanism part Carry out series connection of the 1st compression mechanism part and the 2nd compression mechanism part, and after two-step compression operation When changing to the parallel run of the 1st compression mechanism part and the 2nd compression mechanism part, it is what controls the 2nd compression mechanism part in order to carry out multiple connection of the 1st compression mechanism part and the 2nd compression mechanism part after a plant shutdown. According to this composition, the rapid load change which acts on the electric motor at the time of parallel compression operation starting can be avoided, the over-current to an electric motor can be prevented, and the miniaturization of an electric motor and Dynamo-Electronic Machines and Control Sub-Division parts can be attained.

[0206] [ invention ] while invention according to claim 29 supplies some lubricating oil which the driving shaft drove the capacity type pumping installation arranged in the 1st compression mechanism part, and sucked up from the sump to said 1st compression mechanism part While preparing the oil supply passage which supplies the remaining lubricating oil to the 2nd compression mechanism part through penetration \*\*\*\* prepared in the direction of an axis of said driving shaft In the composition equipped with said oil supply passage in which the

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lubricating oil supplied to said 2nd compression mechanism part carries out a part style to the oil passage which returns to a sump through a sliding part, and the oil passage which carries out a differential pressure inflow through the sliding part of said 2nd compression mechanism part at the inhalation side. When operating only the 1st compression mechanism part, it is what is controlled that the short-time operation of the 2nd compression mechanism part should be carried out periodically. According to this composition, it can avoid that lubricating oil and the condensation liquid of compression gas stagnate in the compression room of the 2nd compression mechanism part, and the starting load at the time of rebooting the 2nd compression mechanism part can be reduced.

[0207] Invention according to claim 30 is what is controlled that high speed driving of the 2nd compression mechanism part should be periodically carried out in the composition controlled that a short-time operation should be carried out periodically when operating only the 1st compression mechanism part. According to this composition, the compressor exterior is made to discharge lubricating oil of the discharge room of the 2nd compression mechanism part with discharge gas, it prevents that lubricating oil stagnates in a discharge room superfluously, and the effect that the shortage of lubricating oil of the electric motor interior of a room can be prevented is done so by returning to an electric motor room again with gas.

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[Translation done.]